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THE SCIENCE OF DRESS.

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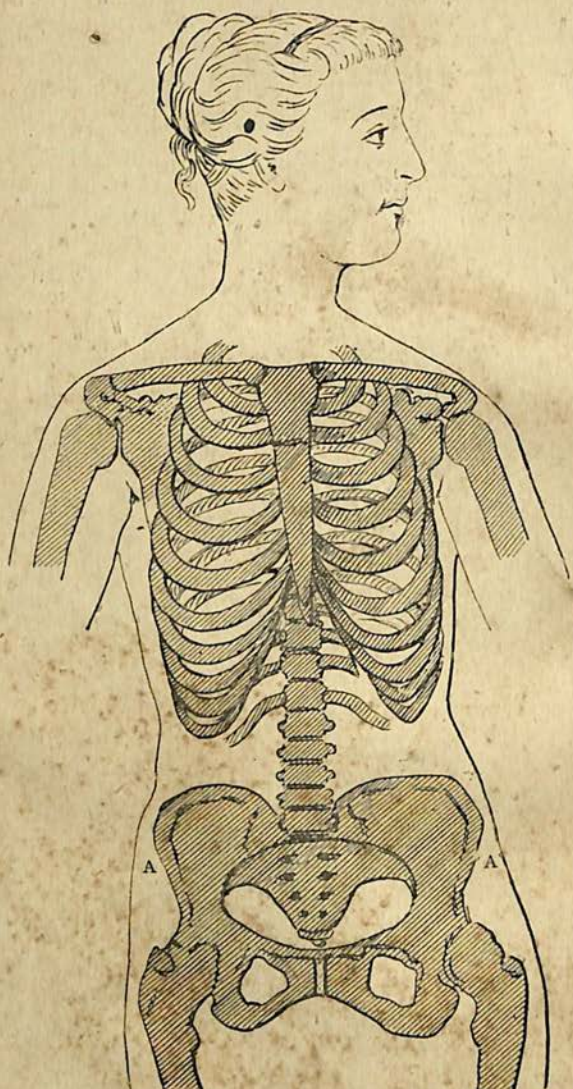

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Plate I.—Normal female figure showing skeleton.

Frontispiece.

THE

SCIENCE OF DRESS

IN

THEORY AND PRACTICE.

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BY

ADA S. BALLIN,

LECTURER TO THE NATIONAL HEALTH SOCIETY, ETC.

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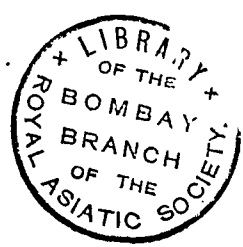
WITH NUMEROUS ILLUSTRATIONS.



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PREFACE.

MANY books and pamphlets on Dress in relation to Health have been recently published, the majority having met with indifferent success, perhaps owing to the fact that they have been written *for* women *by* men who obviously have not been well able to enter into the feelings and conditions of their readers, nor to speak from practical experience.

Writing as a woman for women, it is always my endeavour to point out how clothing may be made, as far as possible, healthy without being unfashionable. This last I take to be a most important item; for, unless they take it into consideration, sanitarians may preach for ever without making a single convert, since women—especially women in Society—dread, and have reason to dread, ridicule, and they would endure tortures rather than appear unfashionable. *C'est le premier pas qui coute;* but no one is willing to make that first step.

My previous publications on the subject of

healthy dress have gained converts, as has been proved to my satisfaction by the large number of letters I have received asking further advice, and inquiring where various articles of dress recommended by me could be procured. The advice was for the most part easy to give; but those inquiries were so difficult to answer that I determined to visit the chief metropolitan outfitters in order to see where genuine hygienic clothing might really be obtained; for I must warn my readers that most of the so-called "hygienic clothing" which we see so largely advertised has no right whatever to the name it claims. The results of my investigations were, in fact, so unsatisfactory that in many instances I have had to arrange with certain firms for the special production of articles of dress under my instructions. In the following pages I mention the names of these firms where healthy clothing, such as I describe, may be obtained, and I hope that by doing so my correspondence on this point will be decreased, although I am always pleased to give advice in matters of importance. The majority of those to whom I applied remarked, "As long as people will buy what we sell, it doesn't matter to us whether the garments are conducive or injurious to health; so why should we go to the trouble of making a change in our stock?" My thanks are, therefore, due to those firms who, at some trouble and expense, are endeavouring to carry out my ideas.

Part of the present volume is compiled from articles on dress which I have contributed from time to time to various periodicals, to the editors of which I am indebted for permission to republish them in the present form. I must especially acknowledge the kindness of Mr. Sergeant Cox, of the *Queen*, and of Dr. Andrew Wilson, F.R.S.E. the editor of *Health*.

I am also much indebted to my friend, Lieut.-Colonel Petrie, for several valuable hints, of which I have gladly availed myself, and to Mr. Bernard Roth, F.R.C.S., for the excellent drawings which form the eight full-plate illustrations of this volume, and greatly add to its value. These drawings were originally made to illustrate a very interesting lecture on "Dress: its Sanitary Aspect," delivered by Mr. Roth before the Brighton Social Union in 1880.

My previous publications on dress, to which I have referred, have been so well received that they have, to use a popular phrase, "gone the round of the papers" in one form or another. In some few instances their authorship has been honourably acknowledged, but in the great majority of cases the passages quoted have simply been pilfered by editors and other authors, and their true origin completely ignored. This being so, I am bound in self-defence to call the attention of my readers to the fact, lest they should say, on turning up a familiar passage in this book, "Why, Miss Ballin

has copied this verbatim from this or that journal," when the contrary is true, the journal in question having, to put it mildly, *borrowed* the passage from some one of my writings.

I believe the wide dissemination of rational ideas on dress has done some good; but although isolated articles and paragraphs may be useful in their way, it is very desirable that a consecutive treatise on the subject should be available; and in order to supply this want, I have endeavoured to make the present work as complete, comprehensive, and practical as possible.

ADA S. BALLIN.

14, Tavistock Square, London, W.C.,
October, 1885.

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THE SCIENCE OF DRESS
IN THEORY AND PRACTICE.

CHAPTER I.

INTRODUCTORY.

In placing before the public a book treating of dress in a scientific manner, I may be allowed to remark that people are apt to look upon the subject in a wholly frivolous way. For my present purpose I will divide mankind into two classes, the people who *think* and the people who do *not think*. Now the people who think, the intellectual part of the population, look upon dress as something beneath and quite unworthy their attention; the people who do *not think* regard it wholly as a means of display. Yet it is in truth one of the great powers which preserve or destroy Health, and its influence is unceasingly felt from birth to death—a matter, not of slight, but of vital importance, for it exercises a powerful, if often unrecognized influence on the health of the community.

Hence, attention to the subject should be considered a matter of duty, and time spent on it ought to be very far from wasted, and it is much to be

regretted that the subject should be so generally treated by the intelligent classes with a sort of contempt, and regarded somewhat as a necessary evil, which must be thought about as little as possible; while, with the exception of a few health reformers, the only people who devote time and trouble to it are those who, looking on dress wholly as a means of display, employ their energies to outdo their neighbours in the brilliancy and costliness of their attire. The true value of dress as a means, under favourable conditions, of preserving health, or, under unfavourable conditions, of destroying it, is not understood as it ought to be; and though I would not have it thought for a moment that I wish to discourage any one from taking pains to obtain "things of beauty" in the way of articles of dress for themselves and their children, I must contend that at least equal care should be taken that those things are such as to be conducive, not injurious, to health—for health, like beauty, is most assuredly "a joy for ever."

From the earliest times the object of dress has been twofold—first, to cover; secondly, to adorn. Amongst savage nations adornment has ever been considered the more important function, but sanitarians are popularly regarded as having no sense at all of its importance.

This misapprehension is probably owing to the fact that certain ladies, calling themselves the apostles of rational dress, go about in costumes so utterly hideous and, to some people's tastes, *immodest*, that they bring ridicule upon the prin-

ciples which they profess to advocate, instead of gaining converts to them. The principles are perfectly correct, but these ladies, having got a smattering of them, tack on to them their own particular fads. Those who are truly concerned in the welfare of their fellow-beings, for the most part, work unseen and unknown by the public. It is time, however, that true sanitarians should come forward to clear themselves from the imputation which has, as it were, been cast upon them by the false prophets. Far from having no idea of the beautiful, we have what time will prove to be the highest and purest of all ideals. Beauty for us is the perfect adaptation of the means to the end.

This definition will be found equally applicable to anything and everything in nature or art; but in its application to the subject in hand—dress—it implies a great deal. The end of clothes, so far as we are concerned, is in warm weather to cover people without overheating them, and in cold weather to keep them sufficiently warm. Hence, as clothes to be beautiful must be perfectly adapted to this end, we must have no garments fitting so tightly as to impede the vital processes, none so heavy as to weary the wearer, none cut in such a way as to cramp her movements, and none dyed with poisonous substances.

What we want is *reform, not revolution.* We want in dress to obtain the maximum of health with the maximum of beauty. If our girls were taught the laws of health and a few of the principles of art as known to the ancient Greeks, they would soon

see "what a deformed thief this fashion is," and would laugh at the squeezed-in waist, the crinolette, and the foot mangled and crushed by high-heeled and pointed boots of recent times, as much as we now, who call ourselves civilized, ridicule the Australian with his nosepeg, or the Bongo negro, who drags his lips down with a plug, and distends the lobes of his ears with discs of wood, in order to increase his personal attractions, or the foot of a Chinese lady artificially deformed in accordance with a fashion which is, after all, only a slight exaggeration of our own.

All over the world, "Il faut souffrir pour être belle," seems to have been the motto of men and women alike, and, strong in that conviction, they have borne, and bear, without a murmur, heavy weights, heat and cold, pinchings and squeezings which displace the vital organs and produce all sorts of deformities, and, in fact, a series of tortures which, if they, instead of being inflicted by such an impersonal tyrant as Fashion, had been enforced by any individual monarch, would have speedily brought his head to the scaffold, and have caused his name to be handed down to posterity as that of the cruellest of men and worst of kings.

In this connection it is interesting to quote the words of a thoughtful writer, Mrs. Oliphant, who, in her book on dress, after reviewing some of the historical changes of costume, says, "The reader will see from this rapid survey how persistently fashion has sought the inconvenient and unnatural in opposition to the merely useful and pretty, and

how little consideration that troublesome deity has ever shown to practical use or to the comfort of her votaries; but, alas! at the same time how universal has been her sway, and how little the higher intellect has done or tried to do against it. How to make locomotion most difficult, and limit the freedom of natural action; how to keep the head hot and the feet cold, in direct opposition to all that doctors and gossips might say, has been apparently her favourite object. The hardy human race has struggled on through all, it has allowed itself to be stuffed out in different directions, now here, now there, with bran in its breeches, feathers in its sleeves, iron in its petticoats. It has submitted to have its head wrapped up in heavy folds of woollen, and its feet left free and airy in silk stockings and pointed shoes. It has 'come through' centuries of troubles of every kind and description, and by dint of hardihood and patience, and immortal vanity, has lived on through all."

Mrs. Oliphant is right in saying that in the past the higher intellect did little to combat the follies of fashion, and her statement is borne out by the fact that, in the reign of Queen Elizabeth, the brightest days of English intellect and the classical period of English literature, fashion in dress had reached a most absurd and unhealthy stage. But at that time there was a certain science which had not yet been born into England—the science of health, or Hygiene. That science may indeed be looked upon as the outcome of the present century. It is true that the ancient Greeks and Romans were good

sanitarians, and that the Hebrews compiled the finest code of sanitary laws which has ever been made; but during the Middle Ages all this valuable knowledge was allowed to lie shut up in books.

Had the Bible been properly studied, those terrible epidemics which decimated Europe could never have happened; yet, so great was the populor ignorance on the subject, that the Jews, whose obedience to the biblical laws saved them from many diseases then common, were, on account of this very immunity, accused of causing the diseases by witchcraft and by poisoning the wells. The present century, however, has witnessed a revival of the science of health. Health knowledge was never so widely distributed among the people as at the present time, when sanitarians are making every effort to increase it and to render it popular. In Shakespeare's time the unhealthiness of certain articles of dress was not understood, so that it is not surprising that there was no revolt against them. At present, however, Fashion's sins against Health are well understood by sanitarians, who are using their best endeavours to make the devotees of fashion understand them also, so that there is every hope that "the higher intellect" will gradually succeed in making dress truly beautiful, which it cannot be without at the same time being thoroughly healthy, for health and beauty go hand in hand.

This phrase that health and beauty go hand in hand is more than a mere alliteration, it contains a deep truth which is not sufficiently acknowledged. There is a hazy belief abroad in the beauty of

decay—a belief which, to a certain extent, may be accounted for by the diseased and feeble members of society being so far in the majority that they have made a law for themselves, while a thoroughly healthy woman is such a rarity that she is almost looked upon as abnormal. The perfect example of the beauty of decay is the consumptive, with soft, silky hair, delicate skin, touched on the cheeks with a brilliant flush, large, dark, sparkling eyes, made to appear still larger by the black rings which surround them, slenderly formed limbs, and tapering fingers with their filbert nails. Yet this is a beauty hardly to be desired: it is but the sign of a disease which before long will stamp it out for ever.

Delicacy is considered by some to be admirable, and women may even be met with who assume a state of ill-health for the purpose of getting sympathy. A great many people are always complaining, but still more go through life uncomplainingly, with a sort of dull, negative suffering, the result of a low vitality, which, if they think about it at all, they attribute to constitutional defects, but which, in ninety-nine cases out of a hundred, might have been remedied by timely obedience to the laws of health.

If people are positively ill they call in a doctor, whose orders they follow more or less scrupulously, but usually without a glimmer of their true meaning; of taking care of themselves, however, and so in most cases preventing the disease which he is often called in too late to cure, they have but the

most rudimentary ideas. There is a story told of an old Jewish doctor who, after performing a dangerous operation, said to his disciples: "Two years ago an easy operation might have cured this disease; six years ago a wise way of life might have prevented it." As it was, in spite of his skill, the patient died next day; and similar cases are happening every day. If people would pay attention to the care of their own and their children's health, there would be a difference, not only in the mortality returns, but in the general vitality. The majority are content to get through life with a minimum of vitality, and thousands struggle on to the appointed age of man without ever having been really ill, but yet without ever having been really well—their condition is summed up in the phrase "feeble health." This content is fatal to improvement; it is like the mental position of the savage, who, knowing of nothing better, makes no progress towards civilization; but the sanitarian wishes not only to imbue every one with the ambition of a "fuller life," but also to teach how it may be obtained. He would maintain, not the minimum of vitality, but the maximum; he would have, not inert resignation to painful conditions, but that joy and glory in living which comes with the possession of perfect health, when the performance of every function is a pleasure. The old monastic idea of the mortification of the spirit through the flesh must die out, and be replaced by a more modern philosophy, which shall teach us to make life happy, and not to regard it as a trial to be got through somehow or other in a

dull, pleasureless, if not absolutely painful way. Without laying oneself open to the charge of selfishness, the care of self ought certainly to occupy a considerable amount of the thought and attention of every individual, and it is only by such care that the condition of the community can be improved.

This principle once acknowledged, no item, however seemingly trifling, which concerns the well-being of the individual can be looked upon as unimportant; and, among other subjects, dress will receive the consideration it merits as a factor in the making or breaking of health, instead of being left to the tender mercies of the ignorant, the idle, and the frivolous.

The battle of dress reform is at the present time being vigorously fought, but the soldiers of the rebel camp have unfortunately adopted a mistaken plan of attack in falling upon the enemy just where he, or rather she, is the strongest. They have all endeavoured to make changes in the dress of the adult, forgetting that the customs and habits of adults are formed, and that the human adult mind entertains the strongest prejudice against change of any sort, even if it be for the better. There is nothing more difficult to alter than a habit once formed, while to prevent a bad habit from being formed is quite easy. The grown-up woman of to-day has been broken in from childhood to wear the ordinary garments and submit to the fashion of the time. She has grown accustomed to them, and custom has so dulled her senses that they utter no protest, however inherently uncomfortable, and

even painful, those garments may be. Hence she meets the attack of the dress reformer with the reply, "I'll allow that your arguments are very plausible; it does seem as if these things were wrong, but I don't feel any inconvenience from them, so they really must be all right."

In point of fact, this is a good reason why average men and women cannot understand the object of the contention of dress reformers—they like that to which they have grown accustomed. Of course sensible people of all ages can and do make modifications in their dress, which render it both comfortable and healthy, and this is done quietly and without attracting any public attention. But if dress reform is to effect any material good for the community, it must be radical. It is no good to oppose the iron rule of custom; we must strike at the root of it, and begin with the children, for, as a reviewer of my former writings on the subject justly remarked, "it is in the hands of the mothers of to-day to effect for the coming generation that revolution in toilette against which the belles of to-day so stoutly or so scornfully array themselves." To put the matter simply, we must begin at the beginning, instead of at the end, as the so-called reformers have tried to do.

If we compare the mortality of the young of the lower animals with that of children, we find that there is no animal which loses its young in so large a proportion as women do. Is this not a disgrace to civilization? Reason is justly considered to be a higher phase of mind than instinct, yet we find the

instincts of the beast a better protection to her young than the reason of the woman.

There is a vague sort of maternal instinct in woman which, as in the beast, generally teaches her to love and to defend her children from violence, but which is wholly powerless to enable her to guard them against the insidious attack of disease or the misery of feeble vitality. Yet, on the strength of this feeling, mothers are apt to believe that the very fact of maternity confers on them the knowledge of how best to rear their offspring. They resent almost as an insult the suggestion that a certain amount of study is absolutely necessary to obtain this knowledge.

A short time back I met with a good illustration of how thoroughly ignorant of the first principles of health a so-called "highly educated lady" may be. On one of the hottest days in July I was at a garden party amongst a group of young married women, when one of the guests chanced to say that I had lately been lecturing on how to dress children. "Oh, indeed," said one young matron, conspicuous for her squeezed-in waist and general air of affectation. "What a strange subject for Miss Ballin to choose; she ought to leave that to married ladies, who have the necessary experience." A few minutes after, this lady remarked that her baby was very ill—"it seemed to suffer so much with the heat." The hostess then asked her if the baby was short-coated yet, as it was quite old enough; whereupon the *experienced* one made answer that she had bought the clothes, but that,

as neither she nor any of the servants knew how to put them on, she was waiting until her mother returned from the country.

On inquiry, I found that the unfortunate infant in question was wearing two thick rollers, one of flannel and one of cotton, shirt, flannel, heavily laced and embroidered long robe, and last, but not least, an indoor cap with three rows of lace. She laid especial stress on the last, and added that all the clothes were *lovely*. Can any one wonder at the terribly high rate of infant mortality, if reputedly educated women thus lose their quality of reason so far as to take pride in their ignorance of matters which concern the well-being, and even the life, of their children?

This class of mother, and unfortunately the class is a very large one, thinks she is doing her duty nobly if she turns her little one into a sort of animated block on which to display costly and handsome clothes, never for a moment considering whether those clothes are healthy and comfortable. She will let her baby grow weak and feverish from being too warmly dressed in the summer, while in the winter she will let it appear in a robe of lace, with bare neck and arms.

The instinct of the hen makes her sit day after day, week after week, on her nest, to warm her chickens with the heat of her own body, lest they should die of cold. The perverted reason of woman makes her, in accordance with a foolish fashion, cut her baby's clothes low in the neck, and tie up its already short sleeves with ribbons, so that "it shall

look pretty." You rarely hear of a chicken dying of cold, but in England more than half of all the children born die under twelve years of age, and they die chiefly from insufficient clothing and improper feeding.

In fashionable circles at the present time, we are constantly hearing of the necessity of making sanitary crusades into the dwellings of the poor; but while I should be the last to discourage so good a work, in my own mind I am convinced of the truth of the dictum, that "Charity begins at home." It is unreasonable to blame the working mother, who is half distracted with the problem of how to make both ends meet, if her children are not reared on the most approved sanitary principles, when the woman of fashion can find no time to attend to a mother's first duties, but leaves her offspring to the tender mercies of ignorant servants.

However much time and thought a mother may devote to the care of her children, both are well spent. People are too apt to regard their little ones as pretty playthings made for their amusement, instead of recognizing that they are highly sensitive beings, whose whole future lives are being influenced for happiness or misery by their present surroundings and the treatment they are receiving. Every mother ought to be pervaded with a sense of responsibility which should prompt her to exercise every means in her power to smooth the path of her children to a healthy and happy life. It is true, in a physical as well as in a moral sense, that, as Wordsworth says,—

"The child is father of the man."

In obtaining healthy dress for the child we are also bringing a good influence to bear on its life conditions. The period of growth is that which, other things equal, determines for happiness or misery the future of the individual. It is the period of greatest bodily and mental activity, when body and mind, as it were, are being built up, and it is the parent's duty to see that they are being built upon firm foundations.

Herbert Spencer says: "The training of children —physical, moral, and intellectual—is dreadfully defective, and in great measure it is so because parents are devoid of that knowledge by which this training can alone be rightly guided. What is to be expected when one of the most intricate problems is undertaken by those who have given scarcely a thought to the principles on which its solution depends?" Here Spencer touches the mainspring of the question. That the sins of the parents are visited upon the children is too true in every sense. Parents are not sufficiently impressed with the idea of their moral responsibility in regard to their children. They do not realize the important truth that every action of theirs which relates to their child, every item of that child's daily life, will influence its whole future, physical and mental; for the two are inseparably interwoven. Nor do they conceive that wider truth, that not only the future of the young individual, but that of generations to come is affected by the treatment each child receives during its earliest years.

Even sensible parents often leave their young

children to the tender mercies of servants, saying, "Oh, it will be time enough for us to look after them when they are older. You can't do anything with babies." In this they are wrong, however: for the first, the earliest impressions are those which are most important for the future of the child, and they are so for a physiological reason. The whole period of growth is important; but, since from birth to about the age of seven years the growth and development of bodily and mental functions are immensely more rapid than at any period of after-life, it follows that greater care is required during these early years, when the consequences of a step in a wrong direction are more injurious than at any other time.

Of course, as Spencer says, parents sin not through malice, but through ignorance; yet surely it is not a Utopian aspiration, nor an unreasonable demand, that fathers and mothers should endeavour, by study and thought, to acquaint themselves with those laws of life a knowledge of which is necessary for the well-being of the tender creatures for whose future they are responsible. These laws are not difficult of understanding, and they are explained in a hundred good and easily accessible books, yet they are universally neglected —a neglect which is perhaps partially to be attributed to a fatalistic idea that "whatever is, is right," and that things should be allowed to take their course.

The do-nothing policy is, however, a great mistake. If things could take their natural course

they would, doubtless, be quite right; but they are prevented from doing so by a thousand obstacles, which must be removed in order to attain that end, and to remove which a knowledge of the natural course is necessary.

Then, again, people are too fond of trusting to chance and grandmotherly precepts or customs, possibly founded on misapprehension, but obeyed implicitly from generation to generation, and too chary of using their own reasoning powers.

There is a common saying that there are two ways of doing anything—a right one and a wrong one. This is only partially true, for, though there may be only one way of doing a thing right, there is an endless variety of ways of doing it wrong; and, though there may be a thousand wrong methods of training children, there can be only one right one, and that must be based upon a true knowledge of physical and mental development, carried out with sympathy, and constantly modified in accordance with observation and experience, as conditions differ in different individuals.

CHAPTER II.

THE BODY IN HEALTH.

I HAVE said that clothing exercises a most powerful influence on health, and that consequently care should be taken to modify it in such a way that its influence shall be good instead of bad, as it too often is; but, in order to modify it thus, it is necessary to know what is the healthy condition of the body.

The body is made up of a number of different organs, each of which has a separate duty to perform; but neither of which can act properly, independently of all the others. If one of these organs strikes work the others suffer in consequence, and suffer in proportion to the importance of the disaffected organ, and the length of the strike. The organs are all employed in different ways in carrying out the work connected with the three great functions of the body, which are—(1) The changing of tissue; (2) The removal of waste or used-up material which results from those changes; and (3) The supply of new material to take the place of that which is constantly being worn out

and removed. The regular performance of these functions constitutes health, while any divergence from it, if not sufficient to be actual disease, at any rate tends towards that downward path which leads to disease.

The organs engaged in these three functions are—(1) The digestive organs, the mouth, gullet, stomach, and bowels, by means of which food is taken into the body and prepared for use; (2) The circulatory, by means of which the prepared food, having been absorbed into the blood, is carried through the arteries to the various parts of the body to form new tissue, while the old and worn-out tissue is carried away through the veins; and (3) The excretory, the lungs, skin, and kidneys, by means of which those waste matters pass out of the body. As far as the subject of clothes is concerned, we have to deal chiefly with the circulatory system in its relation to the skin.

The circulation of the blood is carried on by means of the heart, arteries, and veins.

The heart is a very powerful muscle, which acts as a kind of pumping machine; it is divided down the middle, by a muscular partition, into two parts, called the right and the left side, and no blood can pass from the one side into the other.

The right side of the heart receives the impure blood from the veins, and also the prepared food or chyle from the lymphatics, which there mixes with the venous blood. This mixture is then pumped by the heart into the lungs, through what is called the pulmonary or lung artery, which

breaks up into gradually smaller and smaller tubes until the little blood-vessels are reduced to a size smaller than any hair, when they are called capillaries. These capillaries are fine tubes, with marvellously thin walls, and they are twisted round the tiny air-sacs, multitudes of which form the body of the lungs. Now, in the venous or dark blood in these hair-like vessels there is a quantity of carbonic acid and water, waste matters from the tissues, and in the air-sacs is the air that is taken in when we draw a breath, and the blood is only separated from the air by an exceedingly thin membrane. Hence an exchange easily takes place between the gaseous contents of the blood and those of the air by a process called *osmosis*, in which light and heavy gases change places. Air is composed of about twenty-one per cent. of oxygen, and the remainder of nitrogen with traces of other gases. Osmosis takes place, and the oxygen passes into the blood, while the carbonic acid passes into the air-sacs—the expired air losing about five per cent. of oxygen, the place of which is taken by about five per cent. of carbonic acid. The nitrogen is unchanged in the lungs; it serves to dilute the oxygen, for pure oxygen cannot be breathed with impunity. At the same time moisture also passes from the blood into the air-sacs, and, however dry the outside air may be, what we expire is always quite, or nearly, saturated with watery vapour; it contains, moreover, a certain amount of highly decomposable animal matter. The quantity of carbon which passes from the lungs

during twenty-four hours, in the form of carbonic acid, is fairly represented by a piece of pure charcoal weighing eight ounces, while the quantity of water amounts to about nine ounces, or half a pint, on an average; but it may be less, and is sometimes doubled or trebled. The oxygen which passes into the capillaries combines chemically with the carbon it finds in the blood, which carbon is a product of the digested food, and as a result of this combination heat is given off. The venous blood which comes to the lungs is not in a condition to nourish the tissues, but the purified bright red blood is ready to perform that duty, and is carried by the pulmonary veins to the left side of the heart. This part of the circulation, by which the blood is purified, has been called the *lesser circulation.* In the course of the *greater circulation* the blood is pumped from the left side of the heart into the aorta, the chief artery; this divides into other large arteries, and each large artery breaks up into smaller ones, a process which is continued until the tubes become capillaries. These capillaries are found in countless numbers all over the body, and through their thin walls the nutritive parts of the blood pass out to the tissues, while the waste matters of the tissues pass into the capillaries. The capillaries widen into small veins, the veins into larger ones, and finally into the great hollow veins, the *superior* and *inferior vena cava,* which bring back the dark blood to the right side of the heart, to start again on its journey to the lungs for purification. The processes which

go on in the *lesser* and *greater* circulation are, in a manner, the reverse of one another.

The skin acts as an excretory organ, much in the same way as the lungs and kidneys do; in each of these organs water, carbonic acid, and dissolved matters pass through the animal membrane of the capillaries, but the three differ in the absolute and relative amounts of their excretions. In all three water is the chief constituent, while most solid matter is given off by the kidneys, and most gaseous matter by the lungs. The skin has something of the nature of both lungs and kidneys; it takes in oxygen, and breathes out carbonic acid and water, like the lungs do, and it excretes organic and saline matter dissolved in water, as do the kidneys, with which it is so closely related, that when its action is interfered with, the kidneys do some of its work, and *vice versâ*. When the excretion of the skin is increased, as in hot weather, that of the kidneys is diminished; and when, as in cold weather, less work is done by the skin, the kidneys are brought into more active service. The skin is composed of two layers—the outer or scarf-skin (otherwise called the cuticle or epidermis), and the inner so-called true skin, cutis or dermis. The outer layer varies much in thickness at different parts of the body, being thickest where there is most pressure, as on the palms of the hands and the soles of the feet; it is dead material, containing neither nerve-fibres nor bloodvessels, and is in the form of layers of fine, flat cells or scales laid one over another, like tiles on a roof. These scales

are constantly being given off from the surface as more or less fine scurf, and as constantly being formed in the deeper parts which are contiguous to the dermis or true skin. The true skin is highly sensitive, being supplied with countless nerve-fibres and endings. It is also highly vascular, being supplied by those innumerable tiny blood-vessels called capillaries, though they are far finer than

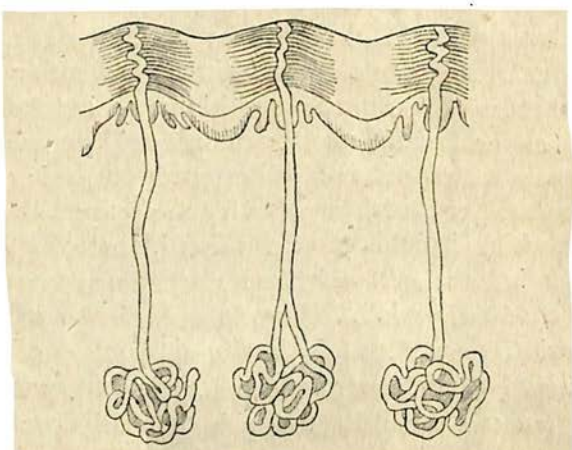


FIG. 1.—Section through the skin, showing the cuticle, with the true skin or cutis lying beneath it, and the perspiratory glands, which corkscrew their way up to the surface of the cuticle, which is shown by the waved, shaded line in the diagram.

any hair, of which I spoke just now. It contains the *perspiratory* or *sweat-glands*, the *sebaceous* or *oil-glands*, and the roots of the hair, which are fed by the latter.

There are many ways of proving that the skin is

continually removing matters from the blood. For instance, if a man's body, or even only one limb, is carefully enclosed in a gutta-percha bag full of air, it is found that changes take place in the air similar to those which happen in respired air. The air loses oxygen and gains carbonic acid, and it also receives a quantity of watery vapour, which condenses on the side of the bag, and may be drawn off if desired. Ordinarily such moisture does not appear on the surface of the skin, but it is given off nevertheless, and is then called *insensible* perspiration; but when the external temperature is very high, or under certain circumstances of mental emotion, or violent bodily activity, it appears in the form of isolated drops irregularly distributed on the skin, and thus becomes *sensible* perspiration. The air in hot climates is far from being wholly saturated with vapour of water, and in temperate climates it ceases to be so directly it touches the skin, the temperature of which is generally twenty or thirty degrees above its own.

The quantity of sweat, or perspiration, whether sensible or insensible, varies immensely, according to conditions of the external air, and to states of the blood and nervous system. It is calculated that as a general rule the skin gives off about two pints in twenty-four hours, nearly double as much water as the lungs do in the same time, but not more than one-thirtieth or fortieth part as much carbonic acid as they do, while it gives off about one and a half per cent. of solid saline matter, lactic acid, urea, and other waste products which would act as

poison if left in the blood, and do so if not perfectly removed.

When a permeable membrane interposes between a liquid and the air, an exchange takes place between the two. Although no pores can be seen in a bladder, water put in it will ooze through its walls and disappear by evaporation. Now the skin, in relation to the blood it contains, resembles a bladder full of hot fluid. Hence perspiration must always be going on through the substance of the skin itself; but the amount of this cannot be ascertained, owing to the fact that the skin is covered with the little glands, whose special duty is to excrete the perspiration.

All over the body tiny holes may be seen which are the openings of the sweat glands passing out through the scarf-skin. These glands are tiny tubes about $\frac{1}{300}$th of an inch in diameter and a quarter of an inch long; they are coiled into a sort of knot, intermeshed with capillaries, and it is calculated that there are not less than two millions and a quarter or two millions and a half of them in the whole skin (see Fig. 1). Their number varies in different parts of the body; they are fewest in the back and neck, where there are only about four hundred to the square inch, and more numerous on the palm of the hand and sole of the foot, where their openings may be seen through a magnifying-glass following the ridges on the skin, which are visible to the naked eye; a square inch of the skin of these parts contains from two to three thousand. The blood in the capillaries is only divided from

the inside of the gland by the very thin walls of the capillaries and of the gland, and by this means, as in the air-sacs of the lungs, an exchange is permitted between the contents of the blood and of the air. Hence it will be seen that there is a strong resemblance between the structure and function of the skin and lungs, and an arrangement similar in principle exists in the kidneys.

Sweat contains in itself fatty matters even when freed from the excretion of the *sebaceous glands*, but when it reaches the skin it mixes with the oily products of these, and also with the little scales which are given off constantly from the surface of the scarf-skin.

It is well known that one of the chief causes, if not *the* chief cause, of skin disease is *dirt*, and that dirt which is the most injurious is this mixture of the excretions from the skin itself when left on its surface.

A dirty skin is a splendid garden in which parasites, both animal and vegetable, may grow and multiply.

Many of those brown stains met with between the shoulders and on the back, are due to a form of vegetable fungus which grows among the scales of the epidermis, and may soon be removed by soap and water. The disease called "ring-worm" is another sort of vegetable fungus, encouraged by similar conditions.

A daily bath all over is one of the most important preservers of health, and soap is a necessary adjunct to the bath, as without it the excretion

of the sebaceous glands cannot be removed, for oil will not mix with water, but does mix with, and is removed by, soap.

Excess of fat or water in the tissues is injurious. An over-supply of fat diminishes the space necessary for the circulation of the blood, and causes the degeneration of the various body tissues. The elimination of excessive fat and water, together with the other waste matters contained in perspiration, is a function of the greatest importance, and one which should be promoted, while everything calculated to check it must positively be avoided.

Soap is so necessary an adjunct to the toilet that it is well to say a word about the right kind to use. All highly-coloured and scented soaps should be avoided, as they frequently owe their attractions to the addition of poisonous substances to their contents. Medicinal soaps should also be avoided unless under medical advice, since most of those advertised are pure quackeries. People can generally find out for themselves, after a few days' trial, a soap which suits their own skins; but that which I generally recommend is "Sanitas Soap," which has disinfectant qualities, and is therefore very useful after recovery from infectious diseases; but is also suited for daily use, especially in warm weather, as it leaves the skin feeling fresh and cool, and removes any unpleasant odours which may arise from the perspiration.

Toilet powders should, as a rule, be avoided, as powder fills up the pores of the skin and is thus unhealthy, even if it is not, as frequently happens,

poisonous. Arsenic is, for instance, sometimes found in violet powder. If, however, as in the case of young infants, some powder has to be used, the best is Messrs. Woolley, Sons, and Co.'s "Sanitary Rose Powder," which is slightly antiseptic and soluble.

Having seen what important functions the skin has to perform, it becomes obvious that nothing must be done which can in any way impair its action. If its action is stopped, death is the result. Thus the case is on record of a boy who, in order to grace a Roman procession, was covered all over the body with gold, the result of which coating was that he died from suppression of the excretions of the skin. Similarly a frog varnished by Spallanzani, the great physiologist, expired in three minutes.

Here then it becomes apparent that special care is required in the selection of clothes, which can exercise a strong influence, either for good or evil, on the performance of the skin functions, and here we find that wool, which is the natural clothing of man as of the lower animals—a statement to which I shall recur hereafter—provides for our necessities.

Wool allows that free transpiration which is one of the vital conditions of health, permitting the foul exhalations of the skin to pass freely away through it, and absorbing any excess of moisture. Vegetable fibre, however, is very little pervious to these exhalations; it absorbs until it is wet, and then leaves much unabsorbed moisture on the surface, chilling it, and checking the further action of the

glands; whereas flannel will, even after a violent perspiration, rest on a skin it has nearly dried, and be only damp itself.

Thus, after violent exercise, a cotton or linen garment next the skin hangs against it damp and clammy, and is a frequent source of colds; so that for such violent exercise as cricket, boating, or tennis, flannel next the skin, and that garment rightly called the "sweater," has been wisely adopted by the male sex.

Silk worn next the skin is warmer and slightly more absorbent than vegetable fibre; but that it does not allow the noxious exhalations to pass freely is proved by the unpleasant smell it soon acquires.

Before quitting this branch of my subject it may be interesting to refer to the colour of the skin or complexion, which is partly dependent on the constitution of the skin itself, partly on the state of the vital functions. Thus the bronze tint of the Hindoo, the black skin of the negro, and the hue of the brunette are caused by the number of pigment cells deposited in the true skin itself. In very fair people these pigment cells are absent. On the other hand, when the skin of the face and hands becomes coarse and red by exposure to rough weather, it is because the small blood-vessels which supply the surface of the parts have become enlarged by abnormal excitement and irritation. The colour of the blood is dimly seen through the semi-transparent outer skin. Thus, when an outdoor life is led, the complexion is fresh and rosy; but when an indoor and

sedentary life is persevered in, the lungs work slowly, the blood is not supplied with sufficient oxygen, the pulse beats feebly, and the complexion is pale.

When the action of the lungs is seriously impeded, as in the case of lung diseases, the skin becomes colourless and waxy, and the vessels near the surface, especially those round the eyes, show a blue tinge, due to insufficient oxygenation of the blood.

When the functions of the liver are disordered, the constituents of the bile remaining in the blood, tinge the skin with a yellow hue.[1]

I have said that the particles of the epidermis are constantly falling off and being renewed, and the daily bath increases the beauty of the complexion by encouraging this process. When we admire the bloom of youth we are looking upon the freshly formed semi-transparent cuticle which permits us to see the tint of the healthy circulation. An appreciation of this fact will lead us to realize that the application of pigments, dyes, or enamels to the face with the hope of restoring the hue of youth and health is about as delusive as the famous instance of "painting the lily." As we grow older the removal of the epidermis is less active, and with more sedentary habits and less outdoor exercise the circulation of the blood is less effective than formerly. Hence ladies are said "to lose their complexion." Again, when the dimi-

[1] As to the influence of tight-lacing on the complexion, see Chapter x., p. 157.

nished faculties of nutrition have caused the embonpoint of middle age to fall away, the skin, which when extended does not again readily contract, is left to crease and wrinkle like that of a shrivelled apple.

It is when, by unhealthy ways of life, women fall into this condition before their time, or when the fulness of years has in no way diminished ingrained vanity, that they fall into the hands of quacks and professed "beautifiers." Some years ago an ingenious artiste, who called herself "Arabian perfumer to the Courts of Europe," advertised that she could make such ladies as would avail themselves of her discovery "beautiful for ever." Whatever inroads time had made upon their attractions, this was to be done, and it was to be done by a process of enamelling.

Many elderly ladies resorted to the "jolie parfumeuse," and submitted to have the enamel laid on in successive washes, holding their faces over a charcoal brazier during the process.

Need I say that the longed-for end was not secured? Those who have read the preceding pages can readily understand that such a result could not possibly be obtained by the means resorted to, which were so injurious that I believe the proceedings ended in a criminal prosecution.

Those who wish for beauty, or to retain beauty, must live healthy and regular lives, cultivate cleanliness, take outdoor exercise, sleep a proper number of hours, but not too long—eight hours is about the proper time for an average adult, and above all,

not eat too much. We see now and then a beautiful old lady or gentleman with smooth pink cheeks, good teeth, and silvery white hair. In their winter beauty they are to my mind as attractive as those others in the bloom of youth of whom I spoke just now. Why are they so? Because they have lived good, pure, and healthy lives. Unless they had done so they would have resembled the repulsive figures of old persons which are unfortunately in the great majority in everybody's experience.

CHAPTER III.

HEAT.

IN the last chapter I described the action of the lungs in purifying and supplying oxygen to the blood; but I could not do more than just touch upon the work which that oxygen does in the blood, in producing heat. Before I pass on to consider this, moreover, it will be well to say something about heat in general, for animal heat is subject to general laws which apply throughout nature, and which should be better understood by the majority of people than they are at present.

Our sensations respecting heat and cold are somewhat deceptive if their origin is not comprehended, and they have strengthened the popular belief that heat and cold are two material substances which enter into our bodies; but that this idea is fallacious will presently appear. The nerves of the skin, by which we know whether we feel hot or cold—whether heat is entering or leaving our bodies to a more than ordinary extent, do not enable us exactly to distinguish degrees of

heat, as the eye distinguishes degrees of light, or the ear of sound.

Heat is a force which is found everywhere, and exists in every body, whether animate or inanimate. It may even be obtained from two pieces of ice by friction, which we know melts them. Cold is simply a relative term, which has no meaning in itself, but is used to signify low degrees of heat; thus, if we say, "Ice is very cold," we imply, "Ice has very little heat."

That every object must possess a certain degree of heat is evident if we regard heat as a mode of motion among particles, for everything in nature is composed of groups of particles. Tyndall, in his great work on "Heat as a Mode of Motion," explains this difficult question very clearly. "It seems possible," he says,[1] "to account for all the phenomena of heat, if it be supposed that in solids the particles are in a constant state of vibratory motion, the particles of the hottest bodies moving with the greatest velocity, and through the greatest space. . . . Temperature may be conceived to depend upon the velocity of the vibrations; increase of capacity in the motion being performed in greater space." Thus friction produces increase of heat, by increasing the rapidity of the motion of particles, and every case of combustion "may be ascribed to the collision of atoms which have been urged together by their mutual attractions." The particles of all substances have a tendency

[1] Ed. 1865, p. 99.

to be set in motion by those of substances of a different kind, although "*vibrations never* take place between substances of the same nature." By this means motion is propagated among the particles of neighbouring bodies, by what is called *diffusion of heat*, until each body is of the same temperature, as may be shown by testing with the thermometer.[2] Thus, if we touch something, the temperature of which is higher than that of our bodies, an increased motion of our particles is set up, and we say it feels warm ; whereas, if we touch something of a lower temperature, our own temperature is lowered by the contact, while that of the other body is raised. The vibration of the particles of bodies may be increased by percussion, friction, and combustion, or other chemical change.

Heat, like light, radiates from all bodies in straight lines, and the temperature of a body, on which radiant heat falls, is raised by transmitted motion, just as a string vibrates when a sound in unison with it is transmitted to it through the air. When heat passes by direct contact from particle to particle of a body, or from the particles of one body to another, it is said to be communicated by *conduction*, whereas, if a space intervenes it is said to pass by *radiation*. Thus the sun's heat is radiated on to the earth, the heat of a fire radiated

[2] In cases where the thermometer is not a sufficiently delicate test a thermo-electric pile is used, by which the heat is converted into electricity, and is then measured as such, by means of a galvanometer.

to one sitting by it; but the heat of a poker held in the hand is conducted along the poker from the end held in the fire to that held in the hand.

Although all substances conduct heat, they do so with different rapidity; those that conduct it quickly are called *conductors*, while those through which its passage is slow are called *non-conductors*. For example, metals are good conductors; but wood, ivory, and animal substances, such as wool or hair, are bad conductors, or, as they are generally called, non-conductors. It is owing to this fact that substances, which are really of the same temperature, may appear to the touch to be of quite different degrees of warmth. A bit of wood, a piece of cloth, and a stone, lying side by side, will, according to the facts just mentioned, be of the same temperature, but the cloth will feel warmest, the stone coldest, because the cloth does not rapidly conduct away the heat of the hand, whereas the stone does.

Similarly air, although of the same temperature, as shown by the thermometer, will feel colder or warmer to us according to whether it is in motion or still; because when in motion it removes heat from our bodies quicker than when at rest, since more of it passes over our surface. Wind, as we know, is air in motion, and we feel colder on a windy than on a calm day, although the thermometer may register the same degree. Nevertheless, air is a bad conductor of heat: compare it, for instance, with water, which scalds at 150° Fahr.; whereas a man in a Turkish bath can without

danger enter a room, the air of which is heated to 200°. Both air and liquids have heat imparted to them by a process called *convection*, in which heated particles, as they become lighter by expansion, rise, forming an upward current, while colder particles, being heavier, sink; but, becoming heated, rise again to give place to others. Thus a sort of circulation is kept up. Solid bodies communicate heat by conduction, because their particles, although vibrating, cannot change their material arrangement and position, the heat or vibrating motion simply passing from particle to particle, whereas the particles of liquids and gases are free to move, separate from each other, and, as Tyndall says, penetrate "in right lines through space."

I have said that substances tend to a uniform temperature with their surroundings, and that two bodies, such as a stone and a piece of cloth, will be found, other things equal, to be of the same temperature. When we come to speak of living things, however, whether vegetable or animal, although according to the laws of heat, there is the same tendency to uniformity, there is here a counteracting agency at work, and every living thing maintains a temperature peculiar to itself, and dependent on its own vital constitution, a temperature a rise only a few degrees above, or a fall only a few degrees below, which would cause its death.

During long-continued frost a thermometer in the centre of a tree trunk does not sink to freezing

point. The temperature of the inside of a tree is said to be above that of the atmosphere if the latter be below 57° Fahr.; but if the temperature of the atmosphere rises above that point, that of the tree does not rise in the same proportion. Hunter found that when the bulb of a thermometer was introduced into the stomach of a carp, the mercury rose to 69°, although the temperature of the pond in which the fish swam was only 65½°. When the temperature of the air was 58°, that of a viper's stomach was found to be ten degrees higher; but when the viper was placed in a temperature of 108°, the heat of its stomach did not exceed 92½°. In what are called warm-blooded animals the difference between the temperature of the body and its surroundings is still more marked, the blood being sometimes nearly 100° above the temperature of the surrounding atmosphere. In the animal body, as long as there is life, the processes of nutrition, of which I have already spoken, are going on, and in the course of these processes heat is constantly being evolved by chemical changes going on in the blood, which is the nourishing fluid. The oxygen gas breathed into our lungs is absorbed into the blood, it there meets with various compounds of carbon derived from the food, and uniting chemically with these gives off heat and produces the carbonic acid which we breathe out, as previously described. Rather less carbonic acid is given off from the lungs than the oxygen absorbed, and it is supposed that the remainder of the oxygen enters

into combination with hydrogen in the blood, producing some of the water which is given off from the body, and also with compounds of hydrogen, nitrogen, and carbon, thus further increasing the animal heat, for heat is evolved whenever chemical combination takes place. Oxygen is carried in the arterial blood all over the body, and wherever there are capillaries, there the oxygen combines with the carbon, and heat is evolved, as elsewhere—in a grate, for instance. But it must be remembered that something is necessary to set up the combination. In the grate, we apply it in the form of a lighted match, and in the same way a certain degree of temperature is required in the body. The combination of oxygen with carbon is going on all over the body wherever the two meet—not only in the lungs, as some have been led to suppose, because it is from the lungs that the chief amount of carbonic acid, the result of their union, is given off.

The origin of animal heat has been for centuries a debated question, and until of late no thoroughly satisfactory results have been obtained; but the theory here explained rests upon facts gained by numerous scientific experiments, and upon inductions therefrom. There is therefore every reason to believe that it is the true one, although animal heat may be in part caused by the friction of the blood in its rapid passage through the arteries and veins, as well as by the chemical action. The theory is borne out by the fact that when the circulation is slow, as in old people and during sleep, the tem-

perature is lowered; whereas in fevers, where the temperature is high, the pulse is always found beating rapidly, and the breathing is quickened.

We know that a fire will not burn unless the air can get to it—that is to say, unless oxygen can come to combine with the carbon of the coal; it is the same in the animal body: the carbon which is derived from the food eaten is, as it were, the fuel which sets our machinery in motion; but that it is not wholly expended in work has been proved by experiment and observation. The muscles convert chemical force into mechanical work, but to quote the words of Dr. Mayer, "The maximum mechanical effect produced by a working mammal hardly amounts to one-fifth of the force derivable from the total quantity of carbon consumed; the remaining four-fifths are devoted to the generation of heat." When a muscle contracts, heat is developed in it. This has been found so even in the muscles of dead frogs. And in the case of persons who die of that terrible disease tetanus, in which a general contraction of the muscles takes place, and death is caused either by starvation through lockjaw, or suffocation, owing to the prolonged contraction of the muscles employed in breathing, the temperature of the muscles is sometimes found to be nearly 11° Fahr. above the normal. The arterial blood charged with oxygen when passing through an uncontracted muscle is changed into venous blood, which then retains about $7\frac{1}{2}$ per cent. of oxygen; but if the muscle is contracted, the arterial blood is almost wholly deprived of its oxygen, the quantity

remaining in some cases only amounting to $1\frac{3}{10}$ per cent. When the muscles are in activity, therefore, there is increased combustion, more fuel is burnt up. As a consequence of this an increased amount of carbonic acid is expired from the lungs, and during great exertion the quantity of this gas which is expired may be even five times as much as that breathed out during repose. A further consequence of the increased combustion, moreover, is that an increase of food is required, and we all know how hungry vigorous exercise makes us.

It is noticeable, too, that the colder the temperature of the air is, the quicker combustion goes on in the body to keep up its heat; breathing is then performed more rapidly; more oxygen, too, is contained in cold than in warm air, and more carbon is required to combine with it in the blood. Thus a larger quantity of food is rendered necessary. In the far North the natives consume an amount of food, and especially of fatty carbonaceous foods, which seems fabulous to those who do not understand why it is required. It is said that an Esquimaux boy can drink two quarts of train oil and eat twelve pounds of tallow candles in a day; or whale blubber corresponding to that amount.

The foregoing satisfactorily explains the reason why exercise of muscle or brain makes us hungry, for brain work uses up the blood to give nourishment, and evolves heat just as muscular work does, and it also shows why we feel that we want more food, and especially more carbonaceous—more fatty food in cold than in hot weather.

Whether a body is animate or inanimate, if it has a temperature above that of its surroundings, as has been shown, it gives away more heat to them than it can receive from them, and it thus continually grows cooler in proportion to the difference between the two temperatures and to the degree of its exposure. As the temperature of the animal body is, except under very rare conditions, always a great deal higher than that of the surrounding atmosphere, animals are constantly losing heat, and it becomes a matter of vital importance that some non-conducting substance shall be interposed between the warm blood and the cold air.

All warm-blooded animals are endowed by nature with some protection against the constant loss of heat. Thus seals, whales, porpoises, and other warm-blooded animals living much in water are protected by a layer of fat through which water cannot pass, and which resists the passage of heat. Land animals also have this protective fat, though in a less degree. Moreover, the skin, being to a certain extent non-conducting, partially prevents excessive loss of heat, and in this duty it is supplemented in the lower animals by feathers or fur, and in man by clothes. Animal substances, such as hair, fur, wool, and feathers, are non-conductors of heat, and the colder the habitat of the creature the thicker the feathers or fur which cover it.

Look, for example, at the thick fur of an Arctic bear, or the feathers of the grebe, which are closely laid over one another to the height of about an inch and a half above the skin. These are nature's pro-

tection to the creatures on which they grow, and they save those creatures from being frozen to death, keeping their blood very far above the temperature of the surrounding atmosphere, which may be below freezing-point, while the interior of their bodies is about 99° to 104° Fahr. Thus human travellers in Arctic regions case themselves in fur, as, without such a non-conductor to retain it, the heat of their bodies would be conducted away into the freezing air quicker than it could be replaced, and the coldness of death would inevitably follow.

Probably every one is aware that clothes are worn to keep us warm, but not all seem to know that they do not communicate warmth to us, but effect their purpose simply by preventing the excessive loss of that heat which is manufactured in our own bodies. Hence, we are warm in proportion as our clothes are non-conductors of heat. As an instance of ignorance on this point, I may quote from an article called "Practical Hints on Children's Clothing," published in *The Queen* shortly after the publication in that paper of my own views on the subject. I should not have referred to this article, which is for the most part merely a restatement of those popular ideas to which I take exception, had not "A Lover of Babies" made the following remark. She says, "It must not be forgotten that wool is a non-conductor of heat, so that if you wrap a child up in ever so much flannel and do not first ascertain that its body and legs are warm, it remains cold all day."

Now, the temperature of a baby's body is nearly

100° Fahr., while that of the room in which the baby spends most of its time should not exceed 65° Fahr., and the little one is often in much lower temperatures than that; but my critic apparently believes that warmth gets into the body from the outside, ignoring the above fact, and missing the whole object of my contention, that children should be clad in woollen to prevent the loss of their natural heat. In point of fact, a shivering baby put into thick woollen clothes would very soon become warm and comfortable, simply because it would thus be allowed to retain the heat it was making for itself. Again, "A Lover of Babies" speaks of fur jackets as "producing undue heat," and thus only restates the popular fallacy.

Heat has been made the subject of so many thousand books, lectures, and articles by scientific men, that it is really time every one should know that it is the body which makes animal heat, not the clothes. We may find a homely but convincing proof of this fact any cold night when we get into bed. We are at first chilled by the contact with the sheets, but the chill wears off, and, when we rise, the housemaid finds the bed quite warm. It has become so from the heat of our bodies, which, leaving it, was kept from passing into the outer air by the non-conduction of the blankets, and of the feathers or hair with which the bed or mattress was stuffed.

Since clothes are only a supplement to the skin, being to man what wool, fur, and feathers are to other creatures, the most natural substances for

human wear are the spoils of those other creatures. From the earliest times man has robbed the beasts of their skins in order to increase the protective power of his own less efficient heat-retaining cuticle. The book of Genesis gives great importance to this ancient custom, and speaks of the Deity as Himself making garments out of skins for Adam and Eve to wear. Thus, in Semitic belief, as, in point of fact, the study of savage life teaches us, the first clothes were skins, and through all the thousands of years which have elapsed since primitive man first clothed himself in finery borrowed from his slaughtered prey to the present day, fur has been a favourite garb of shivering mortality.

The invention of weaving, however, the origin of which dates so far back that it is shrouded in a mist of ages which history has not lifted, brought woollen materials and those made of vegetable fibre into rivalry with the more easily obtained fur. This was a great advance. To produce woven garments no animals had to be slaughtered, while woollen made serviceable ordinary wear, being a good non-conductor, more adaptable than skins, and capable of being washed. Clothes made of vegetable fibres were found pleasant in hot weather, as, being good conductors, they allowed the heat of the body to pass away from it, thus giving a sensation of coolness.

Besides their adorning functions, clothes have two purposes—to keep the body warm and to cover it. Primitive men and women in cold weather wore their skin garments; but in warm weather, dis-

carding these, they probably considered themselves sufficiently attired in a little paint and a few feathers. Later on in civilization, however, it came to be considered decorous to keep the body always covered. In cold weather this was a pleasure, and furs and woollens were worn with satisfaction; but in sultry heat these became a burden, and then it was that garments woven out of vegetable fibre were welcomed as a relief, for vegetable fibres are good conductors of heat, so that garments woven out of them feel cool to the body—at any rate, when first put on.

The savage was doubtless more comfortable in his summer undress, but the next best thing to it was a dress of linen or cotton, which only slightly hinders the loss of heat from the body that takes place when it comes in contact with air cooler than itself.

It is evident from the foregoing that animal substances, especially woollen, form the best and most natural clothing, except in hot weather, and about this subject I shall have more to say hereafter.

CHAPTER IV.

COLD, AND THE HARM IT DOES.

FROM what has already been said on the subject of animal heat it has become evident that any undue abstraction of it from the body must be followed by evil consequences.

Cold is simply the absence of heat, and when the body is surrounded by substances at a low temperature, heat is abstracted from its surface, and a certain painful and familiar sensation is imparted through the nerves of the skin.

The action of cold on the surface of the body is very complex. In the first place it prevents the flow of blood to the skin by causing contraction of the muscular fibre, which lessens the calibre of the small arteries of the skin, and so impedes the flow in the capillaries. It also produces reflex nervous action, which causes the little arteries to contract still more violently, until the circulation in the skin of the part is stopped entirely. That is what happens when on a very cold day your finger is, as you call it, "dead," and it is the first stage of frost-bite in which the part actually dies and comes away. Now when the blood does not circulate near the skin, the action of the skin as an excretory organ

is stopped, and its work of getting rid of waste matters from the blood is thrown upon the other excretory organs, the lungs and the kidneys; these become overworked, and disease results. Besides this, when the blood cannot pass near the surface of the body, it has to go somewhere else, and the consequence is that the internal organs get too great a supply, and are thus rendered very liable to become inflamed.

Thus many diseases are directly occasioned by cold; but, even apart from these, general debility may be induced by it, owing to insufficient nutrition, for animal heat is derived from part of the food consumed, and consequently, if much heat is abstracted from the body by a low external temperature, much of the food matter has to go to supply heat instead of forming tissue, and the frame is practically starved, unless a corresponding amount of nutriment is supplied, which is not always possible, especially in those of feeble digestive powers.

The injury done by cold is most apparent in the case of children, who for obvious reasons suffer from it more than adults do.

The first danger a new-born infant has to encounter is from the external cold. It passes from a high and practically unvarying temperature into one much lower and exceedingly changeable. This danger is increased by the fact demonstrated by Milne Edwards, that the power of generating heat is at its minimum in all animals immediately after birth, increasing as the individual developes, and its strength and activity become greater. Moreover,

the younger a child is, the more readily it parts with its heat, because the smaller it is, the larger is its surface relatively to its bulk, for the area of a body varies as the square of its dimensions, while its mass varies as their cube, and the surface of a human body is an evaporating—consequently a cooling one. The following example will make this point clearer. A cube one inch in the side has six square inches of surface to one cubic inch of bulk, while a cube ten inches in the side has 600 square inches of surface to 1000 cubic inches of bulk, so that the surface of the small cube is ten times greater in proportion to its contents than that of the large one. Now, supposing a child to be one-tenth of the size of its mother, besides its feebler powers of generating heat, it will have just ten times as much surface in proportion to its size by which to lose heat as that mother has.

The lungs in young infants are especially active, and are thus rendered more liable to become diseased than any other organ when increased work is thrown upon them by exposure to cold, and every year thousands of children fall victims to lung diseases, which are very much more common during childhood than at any other time of life, as you will see clearly from the fact that out of 379 fatal cases of pneumonia—that is, inflammation of the lungs—in London and some country districts, 228, or nearly two-thirds, were children under three years of age. But in order to give a fuller idea of the mischief done, let me quote the Registrar-General's statistics. From these we see that in one

year alone (the year 1871) more than 18,000 infants under one year died in England and Wales from pneumonia and bronchitis. If that is not a massacre of innocents, I should like to know what is. And yet this mortality does not represent a hundredth part of the mischief done, for we have to take into consideration all those thousands who, although surviving these diseases and others, such as scarlet fever, measles, whooping-cough, mumps, and croup, the dangers of which are vastly increased by exposure to cold, have been permanently injured by them.

The evils of cold are clearly shown by the enormous death-rate of cold countries—a death-rate chiefly made up by infantile mortality. During the year 1883 the mortality from zymotic diseases was nearly twice as great in New York as in London, and the excess in the mortality from diseases of the respiratory organs and from consumption was very marked. The death-rate of children is protionately high, for while in London the deaths of children under five years of age were 65·1 per thousand, in New York they amounted to no less than 90·3.

In Russia the mortality is frightful, 60 per cent. of those born, actually *more than one-half*, dying before they are five years old, and nearly *two million* children perishing there every year. In some parts of the Czar's dominions the average duration of life is only twenty-six years, and thus Russia shows the highest death-rate of any European country. Of eight million boys born, less

than half attain the age of military service, which in Russia is twenty-five, and of these at least one million, that is, more than one-fourth, are found to be unfit for the army, owing to their shortness of stature and physical debility.

This last fact illustrates another point of great importance—namely, that those who survive exposure to cold are injured by it, either in growth or in development.

The subject of growth is inextricably interwoven with those of nutrition and heat. Spencer, in his great work on "Biology," states[1] that growth is substantially equivalent to the absorbed nutriment, minus the nutriment used up in action. This is a short way of saying that growth is supplied by digested food, but only by the surplus of digested food which is left after replacing the worn-out tissues that are constantly being used up in the body, and the heat which is constantly passing away from it. Thus the more heat that is lost from the body, the more nutriment has to be confiscated for heat-giving purposes, and the less can be devoted to building up the body. Hence cold is an enemy to growth alike in the animal and vegetable world.

An interesting series of experiments bearing on this subject has been instituted by Malling-Hansen, and the results of these experiments were made public by him at the International Medical Congress of 1884, held at Copenhagen. He finds that increase of warmth is accompanied by increase in

[1] Vol. i. p. 122.

the weight of children, decrease of warmth by decreased weight. He found a decrease of 2° in temperature to be accompanied by as much as a ninefold decrease in the weight of a child, while a rise of 3° was followed by a thirteenfold increase in weight.

Weight decreases in proportion as the temperature falls, for the same reason that growth is hindered by cold.

Since growth is so strongly influenced by cold, a knowledge of the normal growth-rate is invaluable to those who have the care of children, as deviations from that normal rate are a sure index to impaired nutrition and general health. In order to ascertain whether such deviations are going on, children should frequently be weighed and measured, for in the one word growth I include increase both in weight and in height.

All infants lose five or six ounces in weight during the first few days after birth; they, however, gain one pound by the end of the first month, and two pounds in the second, after which the increase is less rapid. In the first four or five months the weight at birth should be doubled, and trebled by the end of the first year. During this time the child should gain three inches in height in the first three months, two inches in the next quarter, and two or three inches in the last six months. At three years old the average child is three feet high, and weighs thirty-two pounds; at five years it weighs forty pounds; at eight years its height is four feet, weight fifty-six pounds; at twelve it is

five feet high, and weighs from seventy-two to eighty pounds.

Dr. Squire's statistics on this point, which are averaged from a large number of observations, may be seen at a glance from the following table, which shows the height and weight of children from the fourth to the twelfth year :—

Years.	Height. Ft. in.	Weight. Stones.
4	3 0	over 2
5	3 5	2¾
6	3 7	3
7	3 9	3½
8	3 11	4
9	4 0	4¼
10	4 3	4½
11	4 6	5
12	4 9	5½

At adolescence two stones should be added for every three or four inches in height. Thus, a person measuring five feet six should weigh eight stone; whereas, if measuring five feet eight, he or she ought to weigh nine stone.

In accordance with the rule that growth is hindered by ill-health, its increase is less rapid during the first dentition. Owing to various causes most children grow by fits and starts, adding perhaps three inches to their height in one quarter, and not an inch in the next half-year; but if girls do not increase their rate of growth during their eleventh and twelfth years, their healthy development a year or two later is hampered.

From all that I have said it is clear that every care should be taken to protect children, even more than adults, from cold.

Dwelling-rooms and school-rooms should be

maintained at an even temperature of between 62° and 65° Fahrenheit, which should be regulated by a thermometer always kept well in view. How often may children be seen sitting up at lessons with fingers and noses red and blue with cold, or, on the other hand, confined in a room so hot and stuffy that it is painful to enter it! In this, as in everything else, the only right way is to avoid extremes, which can best be done by keeping an eye on the thermometer. Moreover, it must not be forgotten that the ventilation of rooms must not be sacrificed for the sake of warmth, for, vulgarly speaking, this is only "robbing Peter to pay Paul." If air cannot readily enter and leave the room, the atmosphere by the process of breathing, which I have described, becomes overcharged with carbonic acid gas and vapour of water, and loses its oxygen. The same portion of air cannot be breathed twice, so that if an animal is enclosed in a limited space it dies as soon as all the air contained in its prison has passed through its lungs. Hence bad ventilation is a serious evil.

The sufferings of children from cold are terribly increased by the barbarous way in which they are generally dressed.

From all that I have said, it ought to be very clear that children should be better protected from the cold—more warmly clad—than grown people. But what do we find when we look around us? Herbert Spencer said years ago, "What father, full grown though he is, losing heat

less rapidly as he does, and having no physiological necessity but to supply the waste of each day—what father, we ask, would think it salutary to go about with bare legs, bare arms, and bare neck?" Yet this is exactly what most people allow their children to do, ignoring the fact that, even if colds and the more serious diseases I have mentioned are escaped, injury must result to growth or structure—for, owing to the insufficient clothing, much of the nourishment which ought to supply the development of the organism has to be expended in keeping up its temperature. Exposure means loss of heat, and loss of heat produces dwarfishness, as proved by the stunted and hideous figures of the dwellers in the Arctic and Antarctic regions, and by the dwarfed vegetation of cold countries.

It is therefore impossible too strongly to condemn this custom of exposing children's arms, legs, and necks; for every inch of their bodies which is so exposed is a means of abstracting heat, and a loophole for health to escape by. I have not the slightest doubt that if only the amount of trouble spent by mothers on personal adornment, and on ornamenting their children's clothes, was devoted to preventing the exposure of children to cold, the mortality from the diseases I have mentioned, and the cruel mischief done by them, would be reduced to almost nothing. "We have met with none competent to form a judgment on the matter who do not strongly condemn the exposure of children's limbs," says Herbert

Spencer. Alas, then, to judge from the manner in which we see children generally dressed, how many millions must be incompetent to form a judgment on the matter!

People seem to imagine that they improve the appearance of children by exposing their necks and limbs. For my own part, I never can discover the beauty of the red, harsh, and often chapped and painful skin which results from the practice. The appearance natural to the skin of childhood is a creamy, satiny softness, beautiful alike to sight and touch, and it is therefore no less wrong artistically than hygienically to submit children to the evil influence of cold.

Dr. Inman has said that if you coddle an infant and take care of it, it will very likely grow to be a strong and healthy adult; but if you try and harden it by exposing it to cold, and not clothing it properly, &c., you must not be surprised if you "soon have to measure it for a long box." Whenever I read a sentimental poem about some sweet infant that has gone to a better world, or hear some mother with tears in her eyes declare that her little one "is an angel now," I say to myself, ten chances to one that child died, as thousands die every year, wholly from neglect of laws of health, which it is the bounden duty of every mother and nurse to know and obey, and of which 999 out of a thousand are absolutely ignorant. Often, when women are priding themselves on being the best of mothers, they are, in utter ignorance, actually murdering their children!

But I have often been told, when remonstrating with mothers for exposing their children, "O, I don't believe in coddling; this sort of thing hardens them and makes them strong." This theory of hardening is a fallacy from beginning to end. From one point of view only can anything be said in its favour, and that is, that, allowing there are already too many people in the world, it will be an advantage to get rid of as many of the weakest of newcomers as possible. By adopting the "hardening" plan, the weak ones certainly go to the wall, though I think mothers, even while defending the theory, will hardly appreciate the advantage of this result; but then the survivors are just as certainly injured in health or in development.

Here I would mention also that there are two facts which the advocates of the "hardening" theory entirely ignore. Firstly, when they say, "Well, look at these children; their arms and legs and necks are bare, but they do not feel the cold a bit," or, "I never wrap up, but I do not feel the cold," they forget the principle which I shall presently[2] take some pains to explain, that the senses, when their warnings are constantly neglected, cease, after a time, to give any. Nature has adapted itself to the objectionable circumstances, but this is no guarantee that no harm has been and is being done by them. Secondly, when these theorists point to A, B, or C, and say, "See what a fine fellow he is, yet he was

[2] See Chapter x.

never coddled," they forget that most important of all principles, that *the fittest survive.* A, B, or C may be a very fine fellow indeed, but he is only so because he is the happy possessor of a magnificent constitution, which he has inherited from his ancestors, and which enables him to do with impunity all sorts of things which would be fatal to a weaker individual. The "hardening" theorists only take account of their successes; their failures are quietly put away underground and forgotten, or perhaps remembered with a sigh and the remark that "God loved them, so He took them for His own."

The necessity for a thorough protection from cold is a pressing one, especially for children. The warmth of clothing, whether for children or adults, should be regulated by the thermometer, *not* by the season of the year; and in kind and quantity clothes should be "*sufficient in the individual case to protect the body effectually from an abiding sensation of cold, however slight,*" as Andrew Combe wrote over forty years ago. In the case of infants, however, it is not always easy to know if they are sufficiently warm, since they cannot tell us of their sensations; but the best plan to adopt is to pass the warm hand over the surface of their bodies, and if it feels chilly, to supply increased warmth of clothing.

As the subject of clothing is most important in the case of young infants, it will be well to devote a whole chapter to its consideration.

CHAPTER V.

HOW TO DRESS INFANTS.

FASHION has far too long been permitted to hold absolute sway over the layette, and it is more than time that some radical change should be made in this respect. If the problem to be solved in clothing infants were how best to keep them cold, fetter their movements, check their excretions, and render them generally uncomfortable, no better plan could be adopted than that at present in fashion. But the reverse of all this is what is required in accordance with the laws of health and growth.

Clothing should be warm, but not heavy; it should allow free transpiration, so that the breathing action of the skin may not be impaired, and it should be absorbent of moisture. All these conditions are fulfilled by wool; but the exactly opposite characteristics are possessed by those cotton and linen materials of which infants' clothing is, on the present system, chiefly constructed. Further, clothing must not hinder any of the natural or acquired movements of the body.

Before going into details as to what I consider the most healthy mode of clothing children, I wish to urge the total abolition of what Prof. Humphry calls "a sort of baptism to the numerous evils of fashion in dress," to which the vast majority of infants are subjected, viz. the binder, or swather. I cannot do better than quote Prof. Humphry's words on the subject from his address at the Congress of the Sanitary Institute of Great Britain:[1]— "Those mischievous two yards of calico . . . conconstrict and hinder the expansion of that very region of the body where heart and lungs, stomach and liver . . . are struggling for room to grow and do their work." It hampers the breathing, and may even occasion rupture by preventing due expansion of the chest when the child coughs. It interferes with digestion, and when the stomach is distended with food, causes pain by its unyielding pressure. Dr. Humphry continues:—"A more pernicious device can hardly be conceived than this relic of ancient nursedom, and it is impossible to estimate the number of deformed or pigeon-chests, of hampered stomachs, livers, lungs, and hearts, with their varied attendant life-enduring infirmities and curtailment of life that must result from the use of these 'swathers,' as they are called, for which there is not the slightest necessity."

Binders are a relic of the ancient custom of swaddling infants, which arose from a sort of superstition that infants required to be artificially pressed

[1] Held at Glasgow from Sept. 25th to 29th, 1883. See the "Sanitary Record," for October, p. 151.

into a proper shape, like bear-cubs, which, according to a similar myth, "want licking." The swaddled baby is as incapable of moving a limb as if it were in reality the mummy it resembles in appearance, and the only apparent advantage of the practice is that a mother, when going out, could conveniently hang up her swaddled baby to a nail out of harm's way, in the comfortable assurance that by no possibility could it wriggle itself into mischief during her absence. The custom of swaddling arose from a belief that Nature was unable to perform her duties towards the growing child without aid from Art.

An author, writing in 1658, remarked in evident regret and surprise, when speaking of the Caribs, "They do not swaddle their infants, but leave them to tumble about at liberty in their little hammocks, or on beds of leaves spread on the earth in a corner of their tents; and *nevertheless* (mark the naiveness of this expression) their limbs do not become crooked, and their whole body is perfectly well made." In France, it was Voltaire who first raised a voice against the practice of swaddling, and he maintained that it was the cause of most of the deformities so common in civilized countries. Yet so firmly rooted was this custom in the country of Voltaire, that I have heard my lamented friend, the late Prof. Cassal, say that he was swaddled when an infant.

The treatment ordinarily received by infants in civilized London at the present time is not altogether undictated by the same barbarous idea of

the incapacity of Nature, although the origin of the customs practised is obscured by their revered antiquity; and in outcry against the opinions of such heterodox people as myself, mothers and nurses will doubtless maintain that whatever they do is right, since it was always done by their mothers and grandmothers for centuries past.

The following instructions, although contrary to custom, will, however, be found in accordance with reason, physiology, and Nature.

At birth the navel cord, instead of being bound tightly to the body and pointing towards the chest, according to a common but very bad practice, which is apt to cause premature separation, sore navel, and even rupture at the part, should be wrapped in a piece of clean, soft rag, and left as free as possible. Its tendency will be to incline towards the feet.

The navel string generally dries up and separates from the body about the fifth day, and the following very excellent advice on this subject is given by the Ladies' Sanitary Association in its pamphlet on "How to manage a Baby:"—"If the navel is sore, a piece of very soft linen rag should be put upon it. If the navel seems likely to push outwards, twelve little round pieces of linen rag should be put on it. The first piece should be the size of a threepenny-piece, and the second a little larger, and the third a little larger than that, and so on up to the twelfth, which should be as large as a penny-piece. These pieces should be laid one upon the other with the largest at the bottom, the next

largest next, and so on to the smallest; the whole should then be put on with the smallest piece nearest to the navel, so as just to fit into it. A long strip of rag should then be rolled twice round the body to keep these little pieces from slipping off."

To avoid the evils so graphically described by Prof. Humphry, besides giving up the linen roller, the flannel one should be greatly reduced. Cut a strip of flannel long enough to go twice round the infant. Make one end of this narrower than the other, so that it can pass through a slit in the breadth of the other side. It will then sit quite smoothly round the baby, and should be tied to one side in front with ribbons. The edges of the flannel should be left raw, as, if they are bound, the skin of the little one may be chafed. The flannel should be broad enough to cover the abdomen, and long enough for the ribbon sewn on to the narrow end to tie quite close to the other ribbon, which must be sewn on behind the slit, for if the flannel does not meet in this way, the strings may cut the soft little body. A good plan is to crochet or knit a band of fine, soft, white wool, which can be made like woollen cuffs, and slipped up over the feet. It must be big enough to fit closely to the child, and different sizes should be kept to wear as the baby grows.

The best binder I have seen is that shown in Fig. 2. It is made of flannel, neatly bound with a soft ribbon, and has the front made of silk elastic, shaped to the abdomen, so that there is just

enough pressure to prevent protrusion of the bowels, but not enough to be injurious. Either of these garments may be worn until the infant is three or four months old. It may be left off after four months, unless the child is very weakly; but it should be gradually thinned, lest a chill may result from the sudden abandonment of its use.

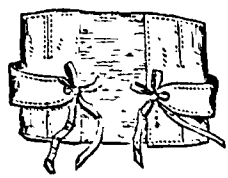


Fig. 2.

Here, while counselling all mothers who use rollers for their infants to give up that most harmful practice, I warn them to be careful how they make the change. A piece of the roller should be cut off every day, so that its loss being gradual, it shall not be missed. Here, as elsewhere, it is of the greatest importance to remember that *all sudden change is dangerous.*

Too tight clothing may press upon and irritate the breasts of young infants and produce enlargement of the mammary glands, which may even go on to abscess. This is often caused by a binder which is too broad, or slips up, or by a string of the dress tied too tightly across the chest. In case of such enlargement occurring, the cause should be at once removed, and a pad of medicated wool placed over each breast to protect it.

The nervous system in infants is extremely unstable, and liable to be injured by disturbances which to us would appear slight. Thus fatal convulsions have been produced by cold, exposure to the night air, excessive heat, or even by a badly

placed pin or painful constriction of the dress. Convulsions are so terribly fatal to infants that the utmost care should be taken to avoid anything which is likely to cause them. As an awful example, let me tell you that according to the Registrar-General's statistics for England and Wales during the year 1871, no less than 20,089 infants died of convulsions.

The necessity for avoiding a source of great danger, which is often incurred in dressing children carelessly, is well illustrated by the following cases:—Trousseau, the great French physician, was called with Dr. Blache to see a child who had for some hours been in convulsions, for which he had been put in a warm bath. Dr. Blache, on removing the child's cap, saw a piece of thread across his head, and on trying to take it away pulled out a long needle which had entered the brain; the convulsions ceased immediately, but the child died soon afterwards of water on the brain. A similar case is recounted by Underwood, where the cause of the convulsions was not discovered till after death, when, on the cap being removed, a small pin was found sticking into the anterior fontanel. Trousseau in his Clinical Lectures [2] relates another case, where a son of a French Professor of Medicine having died of convulsions, for which no cause could be assigned, a *post-mortem* examination was held, when a needle was found transfixing the liver. Such cases as these are, doubtless, very common; owing, however, to the unreasoning but wide-

[2] Dr. Bazire's translation, vol. i. p. 343.

spread prejudice against *post-mortem* examinations, the true cause of the death is generally never discovered. As this prejudice raises unnecessary hindrances to the progress of the healing art, I take this opportunity to protest against it.

Babies' clothes as a rule are made according to a bad old fashion, and have four great faults. (1) They are not made high enough in the neck to keep the chest and shoulders warm; (2) they press on the arms, and so prevent them from being moved freely; (3) they are made so that they cannot be put on without the child's being turned over and over—some even having to be passed over its head; (4) they are too long, full, and heavy. The clothes ought, however, to be made: (1) to cover every part of the body alike; (2) to rest upon the collar-bones so that the arms may be quite free; (3) they should be made so that they can be put on without turning the baby once; (4) they should be short and light, so that it can move its legs quite freely. Two or three kinds of infants' clothes have been invented to fulfil these conditions. Those invented by Mr. Day, assistant-surgeon to the Royal Hospital for Women and Children, consist of three articles. First a fine flannel vest reaching to about four inches below the feet, which should be protected by woollen socks, wrapped round the infant and tied in front with tapes; next a calico shirt with sleeves nearly to the wrist, to reach four inches below the vest; and, lastly, a robe made in the same way, that is, to fasten down the front. The robe and shirt may be fastened with small

buttons, as the vest will protect the skin from their pressure, and the robe may be trimmed according to taste. With these garments dressing is a simple matter. All that has to be done is to lay the shirt on top of the robe, the vest on the shirt, and then slip the child's arms through the arm-holes of all of them together, fasten them up, and you have finished. Thus all risk is avoided of entangling the baby in its clothes or straining it by an unnatural position while being dressed, or making it sick by turning it over and over. In order to prevent any pressure round the waist, I venture to suggest that the belt round the middle of the vest in his pattern should be omitted, as it is quite unnecessary; but, if further fastening should be required, another pair of tapes can be sewn lower down.

The difficulty with garments made in this way, to fasten down the front, is that the infant's arms have to be bent backwards in order to insert them in the sleeves. Now the natural position of an infant's arms is forwards, and if they are carelessly bent back, there is danger of their being dislocated at the shoulder, for in infancy the cup-like surface with which the main-bone of the arm articulates is very shallow, and the process at the outer and upper extremity of the shoulder-blade, which serves to protect the joint, has not reached its firm and full development. Hence, if the clothes are made to fasten down the front, they must be cut very wide in the back, and great care must be taken in inserting the little arms into the sleeves. The clothes,

however, may be made to fasten down the back, preferably rather to one side.

Mr. Day's infant's clothing is made only by Mr. Addley Bourne, of 174, Sloane Street, S.W., with whom I have arranged also to provide all the articles of children's clothing and ladies' underclothing, the use of which I recommend in the following pages. They will be made under my instructions.

The great object to attain is to have an equal warmth over every part of the body, and to obtain the necessary warmth with the least possible weight. We must, therefore, do away with the ordinary cotton or linen shirt, which only covers the middle part of the body, and substitute for it a garment with long sleeves, fitting closely round the throat and reaching to the feet, or a little below them. This should be made of fine flannel or merino, like that used for gentlemen's vests; calico, silk, and linen are all bad, as they are heavy, without being warm, and check perspiration, leaving the skin wet, instead of keeping it dry by absorbing the skin exhalations, as woollen materials do.

The great length and fulness of ordinary baby clothes is very injurious; as the child lies in the nurse's arms, the whole weight of this comes on the legs and feet, cramping their movements, and even deforming the feet by dragging on them. The clothes, therefore, should be made short from the very first, and the legs kept warm by knitted woollen stockings, made to fit loosely about the feet and legs, and long enough to fasten on the

hips to buttons sewn on to the modified binder I have just now described. The buttons will pass through the meshes of the stocking. The diaper will protect the child underneath; it should be put on to pass over the binder and stockings at the sides, and fasten in front with a nursery-pin.

Drawers may, however, be worn even by very young children with great advantage, for if they are worn, the diaper can be folded thick and laid inside them, as they will keep it in place. The drawers should be of woollen material, and the diapers of either wool or cotton, as the ordinary linen diaper is neither so soft and comfortable nor so absorbent as these materials. Diapers are too often fastened so badly that they chafe the parts with which they come in contact, draw up the legs towards the abdomen, and prevent their free movement. I think this may be obviated by cutting the diapers to a triangular shape instead of making them square, cutting out semicircles for the legs, and fastening the three corners in front. A loop may be sewn to the front corner and strings to the side ones, which can be tied through the loop; or loops at the sides may be fastened to a button on the front. The diaper will then form a sort of drawers, and extra thickness may be given to it underneath by laying inside some absorbent material. This plan also removes the objection of overheat caused by the ordinary method of rolling a diaper round the child. With this sort of diaper, stockings should be worn, as above described, and these should always

be well sloped out on the inner sides, so that they may not get wet.

Waterproof pilches, such as the "Baby's Napkin Protector," should on no account be used. They put a premium on dirt and neglect, and by preventing the escape of heat and moisture from the body keep it, as some one has graphically said, "in a state of perpetual poultice," a state which is decidedly injurious. Napkins should be removed as soon as they are soiled; and they should never be pinned with ordinary pins, for this may produce evil results. Doubtless the pin which proved fatal in Trousseau's case by entering the liver had been used to fasten the diaper. The new-fashioned safety-pin, with a solid guard to cover the point, is, however, unobjectionable.

The diaper can generally be left off at about six months, and then the stockings should be shortened and supplemented by little flannel drawers. Over the vest described just now, another, made in the same way, but without sleeves, should be worn in cold weather. The next thing is the robe, which for winter I should make of a pretty twilled flannel or other woollen material that will wash. It should have sleeves to the wrist; and, so that it may fit closely to the throat, it is best to make it fulled-in to a little shoulder-piece or yoke. Like the other garment, the robe should only reach the feet, or a couple of inches below them.

None of the clothes should be gathered at the waist, but what little weight there is should hang from the shoulders.

When, from unusual tenderness of the skin, the woollen material of the vest irritates or induces too much perspiration, spun cotton may be used; but I do not recommend this except in rare instances. When woollen materials irritate, it is generally because they are too coarse or too new; therefore, the softest and finest obtainable should be used. To make baby's vests no material could possibly be better than that cut from vests which have been worn out by its father, for he will have taken the roughness off them.

I have seen very nice garments for children knitted of fine wool; these have the advantage of stretching with every movement; they can be made like slips and worn between the vest and the robe in cold weather. I strongly deprecate the habit of dressing a child in thin clothes in cold weather, and then wrapping it up in a shawl, which cramps its movements, or keeping it near the fire, which makes it very liable to take cold directly it is in a cooler atmosphere.

Much mischief may be done by the excessive relaxation induced by children being clothed too warmly in hot weather. If, on the one hand, the child is bathed in perspiration, or, on the other, if the skin feels hot and dry, without your being able to account for this in any other way, you may conclude it is too warmly dressed. Rashes such as those, the popular names of which are "prickly heat," "red gown," and "red gum" may be caused by the use of over-warm clothes in the summer.

Infants' heads are generally kept too warm,

which, considering the natural tendency to nervous excitement and the rapid circulation of infancy, is a very bad practice. Nervous excitability is so increased by the head being kept very warm, that any accidental irritation is under these circumstances much more likely to be followed by spasmodic or convulsive fits than under any other conditions.

Infants do not require caps indoors, where the temperature is generally rather high; but when carried from room to room the square of flannel which forms part of every layette should be wrapped round them and over the head. Nervous excitability, and with it the liability to convulsions, is much increased if babies' heads are kept too hot; and the absence of hair from the little heads may be taken as an indication that Nature has provided for their being kept cool. The pillow on which they sleep should not be so soft that the part of the head in contact with it sinks into it and becomes overheated and perspires freely, while the rest of the head is comparatively cold. This is a frequent cause of colds.

Night-gowns should be made of flannel, and be worn over the vest. They also should have long sleeves, so that there need be no fear of the child's taking cold when it kicks off the bedclothes. Bedclothes should be as light as possible; and, on the principle that the movements of the body and limbs ought never to be impeded, they should not be tightly tucked in.

In cold weather a down quilt is very nice. Care

should be taken as to the position in which baby lies. The best position for a child to lie in is on its back. If it lies on either side the ribs will be pressed inwards by the bed below and the weight of the arm above; and, moreover, if such a position is habitually assumed, the spine may become twisted, and lateral deformity result. If it is laid on its stomach, as is far too often the case, breathing is rendered difficult, the breast-bone is compressed, and the chest lessened in its dimensions, while the action of the diaphragm is hampered by pressure on the abdomen.

As I have already said, children lose heat very rapidly, and as the circulation is slower during sleep, they require then to be clothed even more warmly than during waking hours; but excessive heat must be as carefully avoided as debilitating cold. As, however, the little ones cannot tell you whether they are too warm or too cold, you must ascertain the state of affairs by passing your hand over their skins.

New-born infants as a rule sleep with the mother, in order to benefit from the warmth of her body. This plan, however, is a dangerous one. In the first place, children sleeping with adults are liable to breathe contaminated air; secondly, an accidental displacement of the bedclothes may easily suffocate them; thirdly, they may run the risk of being, as it is called, "overlain." At an inquest held in St. Pancras, on the 12th of March, 1884, upon the bodies of two children who were found suffocated in bed with their parents, the coroner, Dr. Danford Thomas, stated that he held every

year between 120 and 150 inquests upon children who had met their deaths in this way. In Birmingham the borough coroner held four inquests on the 18th of October on infants who had been overlain in bed, and he remarked that, in order to avoid such large sacrifice of infant life, cots for children should be provided, as enforced by law on the Continent. The line between the accidental and intentional disposal of infants is allowed to be very indistinct. These facts I quote from the *Lancet* for October 27th, 1884. Mothers, when they take their children into bed, should put them back into their cots directly they have been fed.

After the first week or two, if an infant wants more warmth than can be got from clothing, a hot water-bottle, hot brick, or sand-bag wrapped in flannel may be put in the bottom of the cradle. Cradles or cots should be raised to a level with the mother's bed, and should *never be made to rock*. A bad practice is unfortunately very prevalent, of which the mildest form is rocking a baby, or walking up and down with it until it goes to sleep; while the most aggravated form is to jump it up and down when it cries, by way of pacifying it. No doubt the treatment is effective in that it makes the baby go to sleep, or stop crying; but it does so simply by a process of stupefaction. Indeed it might be made so effective that the child would never cry again at all, so thoroughly might the shaking disturb the brain as to stop the vital processes. Fathers especially are fond of tossing their children high up into the air, turning them

head over heels, &c. Now, just imagine the nervous shock you would suffer if some great giant were to treat you in this way, and then you will have some faint idea of the injury done by this practice to infants, whose nervous systems, remember, are much more easily disturbed than ours. I have little doubt that many an embryo poet or philosopher has literally had his brains addled in this way.

I read a very good illustration of the commonest form of this practice, as carried out by mothers, in a comic paper. Said a gentleman to his wife, who for the last hour had been shaking her baby up and down on her knee, "My dear, I don't think so much butter is good for the child." "Butter? I never give my Tootsy-Wootsy butter—what an idea!" "Well, you know, you gave him a good feed of milk, and now you've been over an hour *churning* it!"

If parents could only be made to understand the mischief done, not only to the nervous, but also to the digestive and circulatory systems of their children by this idiotic custom of jolting and tossing them about, as if they were mere inanimate toys, I am sure they would speedily abandon so harmful and irrational a practice. Children should not be rocked or patted off to sleep; but simply laid in their cots, and if for the first night or two they cry a little, this will not hurt them, but will rather be good mental discipline for the future; they will soon gain the habit of sleeping without external help. By rocking a baby, sleep is obtained

through a process of stupefaction, and the practice is as bad as, and very similar to, that of giving chloral or morphia to an adult to procure the same end.

CHAPTER VI.

OUTDOOR DRESS AND EXERCISE FOR YOUNG CHILDREN.

I CAN easily imagine how, after reading the foregoing, where I advocate short clothes for even the youngest infants, many a lady exclaimed, "Why, how absurd a baby so dressed would look lying in the nurse's arms when it went out for a walk!" Very likely; but that question does not concern me in the slightest degree; for I do not approve of babies being carried out in the nurses' arms at all. I will give my reasons for this rather startling proposition in as few words as possible. When infants are carried in the streets, they are generally in unnatural and injurious positions, as with the head hanging over the arm, so that a spectator fears the neck may be dislocated, or with the feet turned inwards, &c. They are usually carried on the left arm of the nurse, and affectionately hugged so closely to her, that the right arm of the child is pressed against its chest. The chest-walls of infants partaking of the gristly and easily bent nature of all infants' bones, the side of the chest is pressed inwards, lessening the lung capacity. Then, also, the child's head leans naturally to one

side, so that the muscles of that side are contracted, while those of the other side are lengthened, and this is a not unfrequent cause of the hideous deformity known as wry neck. The head hanging over the arm impedes the breathing, and a still further danger is incurred by this position in the risk of the neck being dislocated by a chance knock or push from a passer-by. A case of death from a sudden jerk to one side of an infant's head is mentioned by Hufeland. A tendency to squint is often encouraged by the custom of carrying a child always on the same side, or of suckling it always from one breast.

The nurse, too, finding the child heavy, and that she gets tired, curtails its outings, and instead of spending several hours in the air, as it ought, the time dwindles down. Then, again, if the child is carried, it may inhale the exhalations of the nurse's body, which are not always of the sweetest, and of her clothes, which are not always of the cleanest.

If it is decided that a baby *must be carried*, care must be taken to avoid these dangers. It should lie as straight as possible along the nurse's arm, and her elbow should project beyond its head to protect it from accident. It must not be carried in a sitting posture until it is about five months old. As, if it is carried so too early, the spine is overtaxed, and the pressure on the chest caused by the hand supporting it is likely to be injurious. It must be borne in mind that the bones of a young infant are little more than gristle, and are liable to bend, and so become deformed. After

about five months the sitting posture may be allowed for a few minutes at a time, if there is no suspicion of rickets, and if the child seems to like it. Care must be taken, too, in carrying a child, that no part of its body be compressed in any way. Moreover, the arm on which it is carried must be changed from time to time, otherwise deformity may result from leaning always on one side, or a tendency may be contracted to turn the eyes in one direction or squint.

However, I consider that from almost the earliest age infants ought to be taken out in perambulators, and, if they are properly dressed, I feel sure that there need be no fear of their thus being more liable to take cold than if they were carried. When I speak of perambulators, I do not mean the old-fashioned and, unfortunately, still very common kind, with a seat and a strap across to keep the baby in; where the head most often hangs over the side of the machine, or the body tends to collapse in a heap on the floor of it. These may truly be called "infernal" machines, which seem to have been invented especially for the purpose of producing deformity. I mean those light, four-wheeled carriages which are now happily coming into vogue, which have a sort of mattress at the bottom for the infant to lie upon, and seats which can be put in, so that older children can sit up comfortably, the wheels of which are cased in india-rubber, so that the vibration when they are in motion shall be as slight as possible. I do not, however, approve of the usual way in which the child is placed in

these carriages, with its back to the movement. This practice, doubtless, originated in the idea that if the child faces the nurse, she is better able to see, in common parlance, "what it is up to;" but this benefit is not sufficiently great to warrant possible brain injuries resulting from its unnatural position during movement. The natural position in moving is with the face forwards, as in walking, and that the opposite position is injurious is sufficiently strongly suggested by the discomfort which it causes even to grown people. Painful or uncomfortable sensations are always a danger signal, and if, being experienced by an adult in the above circumstances, they point to some harm that is being done, how much greater must the injury be in the case of infants, whose nervous systems are so much more unstable. The child, then, should invariably be placed facing the movement; and the hood, which has its back to the movement, should be raised to protect it from the draught caused by the motion of the carriage through the air. The wind is apt to "take away the breath" of a tiny child, and draughts may give colds to bigger ones. In rainy weather a second hood can be raised over the child, or an umbrella held over it; but little infants should not be taken out in the rain.

A pillow should be laid in the perambulator to make a bed for baby, with a little pillow at the top to support its head; the infant should then be laid on it as if put to bed, and a nice fur rug laid over it. Sent out in this way the risk of cold is minimized. In cold weather young infants should

have veils over their faces and mouths. The best thing for this purpose is lace, which, however, must not be too thin; the old-fashioned Brussels lace veils, perhaps doubled, are extremely good. Woollen veils should not be used, as the particles of the wool get breathed in, and are apt to irritate the throat and nasal passages. For the same reason the fur rug should always be well shaken out before use, so that there shall be no loose hairs. Bearskin is one of the best furs for this purpose, and white bear looks lovely with the rosy face of baby peeping out over the edge of it.

Children after the first few weeks of life, and unless they are delicate, should not be kept at home merely because the weather is cold, but should have on warm out-door garments.

Young children of both sexes should always wear hoods out of doors. It is commonly noted by doctors that baby-boys suffer greatly from earache and catarrhal diseases of the ear; whereas little girls rarely suffer in that way. The cause is not far to seek, for girl-babies generally wear hoods out of doors, while infant-boys, by some cruel freak of fashion, are condemned to wear uncomfortable, stiff, and unprotecting hats. The ear-pieces which are sometimes put on boy's hats either slip out of place and are useless, or have to be fastened with elastic or silk strings so tightly under the chin that the pressure is injurious. Hoods made of white cashmere, and lined with the same material, are both healthy and comfortable, or they may be crocheted out of Berlin wool and lined with soft

white cashmere or llama. Of whatever colour the outside may be, the lining should always be white, for reasons I am going to explain later on.

In putting on the hood care should be taken that the ears lie in their natural position, flat, underneath it. If the hood is carelessly put on, the ears may easily be doubled forward by it, and become permanently deformed by a continuance of this practice. Here I may also observe that children's ears are frequently disfigured by hats which are pressed down too low upon the head, or by the elastic or strings of the hat, which, being carelessly fastened under the chin, push the ears forwards and outwards. It is wonderful how careless mothers and nurses are in this respect, considering what a great disadvantage it is in after-life to have ugly ears. Infants should not be allowed to lie asleep with their ears doubled forward by the position of the head.

Warm woollen overdresses should be worn by infants instead of the long heavy cloaks with capes generally adopted; and, indeed, very pretty and cheap outdoor garments for children of any age up till five or six may be made of some thick white woollen stuff, or knitted or crocheted out of wool. For infants these should reach two or three inches below the robes; after the child can walk, it may be made to the ankles. Both this and the summer cloak should have sleeves, so as not to impede the movements of the arms, as capes do, and should fasten down to the bottom.

Capes are very undesirable, as their weight is

unevenly distributed, hanging entirely from the neck and shoulders; they also open, leaving the chest exposed, and allowing the cold air to attack it and the armpits. About the most charming winter jacket for a child of any age from ten months to seven years is an ermine one, with or without the little black tails, and lined with white or pale blue satin, a little frill of which finishes off the neck. Squirrel-back is also very pretty, lined with grey satin to match. The advantage of fur jackets is their great warmth and extreme lightness; they should be ventilated and made long enough to nearly reach the ankle, and should fasten with hooks and eyes down to the very bottom. Seal-skin is not to be recommended for children's wear, as it is too heavy. Pretty little muffs may be made of the same fur as the jackets, and the muffs should be fastened round children's necks, so that they may not be lost. They should not, however, be hung on by a cord, which drags the neck down by the weight of the muff attached, but should have a broadish ribbon to match the lining passed through them and over the child's head; this must be prevented from pressing on the neck by being fastened to the back of the jacket about two inches below the collar.

Fur hoods are not to be recommended unless they are ventilated, as the ordinary fur hood keeps the head too warm, and does not permit the perspiration to evaporate. As I said before, I now insist again, that boys as well as girls should wear hoods. That his sex is not publicly advertised

should not be a very serious grievance to a gentleman under five years old. The hoods may be made of satin to match the lining and frill of the jacket, but should be lined with fine white cashmere.

Children able to walk should have woollen or fur gaiters over their legs when they go out. Children should never be kept at home simply because the weather is cold; if they are properly dressed, the cold will do them no harm, unless they are already out of health. Even drizzling rain is not to be feared, and the children may be taken out in frosty weather, or slight sleet, and even when the snow is thick on the ground, provided their boots are waterproof, and that the nurse can be trusted to see that they do not get severe falls. Fog, however, should be avoided like poison, which in very truth it is.

The little ones should be out in the air as much as possible. In the winter they should go out in the morning from 10.30 till 12.30, and in the afternoon from 1.45 till 3 o'clock. In the summer they should be out from 8.30 till 10.45 in the morning, and from 4.30 till 7 o'clock in the afternoon; their meals must be managed so as to leave these hours free. In winter they should have dinner a quarter of an hour after returning from their morning airing, and should sleep in the afternoon from 3.30 till 5 o'clock, when they should have another meal. In the summer they should have a very light meal on returning from their morning walk, and be put to sleep at about 11.30, dine at 3 o'clock, and have supper at 7.15. Of course young infants require to be fed more often than this, and cannot be kept out

continuously for so long; but they can be taken in for a few minutes, fed, and then brought out in the perambulator again.

Open-air exercise is one of the most important conditions for the preservation and obtaining of health, and though exercise for the young infant must be passive, for the child who can walk and run, it may, and should be very active indeed; and children, instead of being commanded to walk steadily for fear of spoiling their clothes, should be encouraged to play in the open air as much as possible. They should be given toy sets of harness, so that they may play horses. They should skip and roll hoops, and, above all, play ball. Ball is the oldest of all games, and the one most in favour with the ancient Greeks, the nation of all others the most remarkable for its muscular symmetry. The ordinary india-rubber ball, about three or three and a half inches in diameter, is so light that, while it can be thrown about in every way, and give exercise to every muscle in the body, at the same time strengthening the lungs by the increased rapidity of respiration, if it strikes any part of the body it can do no harm, and does not even produce as much as a bruise. Of gymnastics I propose to write at some future time; but no amount of gymnastics can have that healthful, physical, and mental influence which belongs to a good game thoroughly enjoyed.

The old prejudice against young children being allowed to sleep in the open air probably arose from the fact that in the old-fashioned perambu-

lator the child's head was apt to hang in bad positions during sleep, and I have often seen a poor baby sleeping with its head hanging over one side of the machine, and observed the nurse or mother shake it with the remark, "Stay awake, can't you?" But the more hours a day a baby sleeps the better, and the more it is in the open air the better also, and so it is well, if possible, to combine the two.

Unless the temperature of the air is damp and chilly—as at night, for example—good rather than harm will result from the little one's sleeping out of doors, if it is lying in a comfortable position and is properly clothed. It is necessary to clothe the child more warmly during sleep than when awake, for the temperature of the body falls during sleep.

If there is a garden or square to which access can be obtained in warm summer weather, it is a good plan to carry out a plain wicker bassinet with a blanket folded in the bottom, and let the baby lie in that instead of in the nurse's arms; or it may be laid on a rug on the grass, and allowed to kick to its heart's delight, which will do it a very great deal of good. The same thing may be done if there is a safe balcony or leads attached to the house. The hood of the bassinet will keep the sun off the child, and if a rug is used, an umbrella or a towel over two chairs should be carefully fixed up to serve the same purpose. A child can lie thus for hours on a warm day, drinking in the air and sunshine, and gaining a store of health for its future life.

It is irksome for the nurse, and injurious to the

infant for it always to be in arms, and people are far too afraid to let babies lie about and exercise their limbs freely by stretching them in all directions. They will do this if left to themselves, but they cannot do it when cramped by the nurse's body and arms, or even by the walls of the cradle. The children of a learned professor, a friend of mine, when infants, were accustomed to lie all day on rugs on the floor, or on the grass, and as soon as they could crawl, they were put to sleep also on mattresses on the floor, which effectually prevented any danger of their falling out of bed. Care was taken that these children should be out of harm's way; but they were always allowed perfect freedom of movement, and not constantly watched and restrained. The result has been all that could possibly be desired; they have grown up perfectly developed in every limb, strong both in body and mind, and completely devoid of fear. There is such a thing as watching and guarding children too closely, and so making them from the first too dependent on others. It must not be forgotten that education, in the true sense of the word, begins from the very first moment of life.

The baby moving its limbs, and rolling about on the floor or grass, which it can do with perfect freedom in the short clothes I advocate, but not in the long ones generally worn, gains power in its muscles, and will soon begin to tumble about and crawl. If external sources of danger are removed, it cannot easily hurt itself, and it will crawl until the bones are firm enough to bear the weight of

its body, and the muscles powerful enough to move them. An old writer says of the children of the Caribs, "although the little creatures are left to roll about on the ground in a state of nudity,[1] they, *nevertheless*, grow marvellously well, and most of them become so robust as to be able to walk without support at six months old."[2] The word, nevertheless, which I italicize is an expression of *naïve* surprise, for the author had been accustomed to the swaddling and restraint system, and naturally thought no other could be successful. That the system here advocated is that which best serves the purpose of development is shown by the above quotation. By means of natural and proper exercise the muscles get strength and tone, and the bones acquire firmness. I do not think any one can cite the case of even one baby brought up carefully in arms which could walk, if only a few steps, when six months old. It is important that all the muscles should be rendered strong and firm, for they command the bones, and if one set of muscles is weak, opposing sets drag out of position the bones they should keep in their proper places. It is especially necessary that the muscles of the back should be strong; for if they are not, the greater weight of the body being towards the front, the spine will bend forwards, and the proper expansion of the chest be interfered with. The bones of the chest are: the spine at the back; the ribs at the

[1] The heat of the climate permitting this without harm.

[2] "Histoire Naturelle et Morale des Iles Antilles." Rotterdam, 1658.

sides attached to the bones of the spine; and the breast-bone, or sternum, to which the ribs are attached in front. The ribs incline downwards with the spine, so that when we bend forward the capacity of the chest is diminished, and breathing hampered; from this come pallor, general debility, and diseases of the chest. The muscles of the back counteract the action of those of the chest in maintaining the erect position of the body, to preserve which no less than five layers of powerful muscles along the spine only are engaged. The spine is a highly flexible column, made up of a number of bones called vertebræ, united by cartilages and ligaments, and movable in all directions by the action of the overlying muscles. In childhood the spine is most liable to yield and become weak or deformed at the neck and loins, for the neck has to support the weight of the head, and the loins that of the internal organs of the body. In early infancy the muscles of these parts have not attained the strength necessary for the performance of these duties. The new-born infant's head falls forward, or from side to side, and requires to be carefully supported, lest the neck should be dislocated. Even quite tiny babies are unfortunately often carried in a sitting position, when they of course stoop forward, the head drooping, and the arms hanging forward beyond the centre of gravity; these drag on the shoulders, which are further rounded, while the strain on the muscles of the back is increased; and if the practice is persisted in, a permanent deformity results from it. Further,

when the head falls forward, and the spine becomes bent, the cushion-like cartilages between the vertebræ become thinned on the inner side, and the angle at which the ribs stand out from the spine is diminished; the ends of the ribs are thus brought nearer together, the breast-bone drawn inwards, and the cavity of the chest diminished. The ribs in inclining downwards push down the organs of the chest, so that they press on to the abdominal organs, and prevent them from acting properly. The same evil results in an increased degree in tight lacing, as I shall point out when discussing that subject.

Children should not be allowed to sit up until they have been seen to do so on their own account, which they will, as soon as they are strong enough, if left to themselves. This leads me to remark that the high chairs used for young children are injurious. A bar is placed across the front of the chair to prevent the little one from falling out, and the little one leans forward against it to get at the playthings on the table in front. The chest is thus pressed inwards against the bar, the shoulders are rounded with the scapulæ projecting, the head falls forward, and the muscles of the back are elongated and weakened. The legs, too, resting on the board placed underneath to support them, are cramped, and the child is actually forced into a bad and unhealthy position.

A rug on the floor is the best place for a small child to play, and it should be allowed to roll about as much as it likes. As it grows bigger, a low

chair and table suited to its size can be provided; if it falls off that chair, no harm will be done; but to fasten a child in one position may produce serious evil.

When by crawling about the child has acquired sufficient strength, it will not only sit up, but it will catch hold of tables and chairs, stand up, and try to walk by catching at one object after another. Before this takes place any attempts to *teach* it to walk are highly injurious, and both parents and nurses should take this thoroughly to heart; for both, either for their own amusement or from vanity, are very fond of encouraging the little one to walk "like a man," and show off this too precocious accomplishment.

Among the poor, children are put on their feet too young, because the mother is too lazy or too busy to carry them, and also from motives of vanity, and this is the chief cause of the appalling number of bow legs, flat feet, and other deformities which we see in our walks abroad. Without any attempts to teach it, the child would walk when it reaches the proper stage of development, because it has inherited the capacity to do so, and because it is urged to do so in imitation of others.

Cases in which this has taken place are rare, because the vast majority of people, educated or not, are imbued with the erroneous notion that it is necessary to hurry up Nature in this respect; but a distinguished physician informed Dr. Bastian that up to the age of two years his daughter had never walked a step, nor even tried to walk, when

one day he put her in a standing position, and to the great surprise of those present, she walked from one side of the room to the other.

In the first attempts to walk the child has to acquire the power of maintaining its equilibrium; if it is held up by one arm the attitude is unfavourable to this, and trunk and spine are twisted to one side; if by both, the position is also unnatural, and in either case there is a risk of dislocation at the shoulder if a stumble occurs, while the lower limbs are apt to yield, and the little one becomes careless of its own exertions, which is alike bad for its body and mind. All baby-jumpers, baby-walkers, and inventions of that kind are to be avoided. Leading-strings give support at the risk of compressing and deforming the chest; but there is no objection, when the child has gained strength to stand, to placing one hand on each side of the chest, so as to give the slightest possible support, while being ready to give more if the balance is lost. By this plan, natural efforts are assisted without being forced, and the child becomes able to walk, not only sooner, but more safely and gracefully than is possible when any artificial method is adopted.

In lifting young children, care should be taken never to take hold of them by the arms, as the sockets of the joints are so shallow, and the connections of the bones so feeble, that dislocation may easily take place. For the same reason the practice of raising children in the air by alternate arms and legs "to see if they are all right" is

most dangerous. The hands should be placed on each side of the chest below the armpits to lift the little ones.

When they are just able to walk, the manner in which children are dragged along in the street by one arm is extremely reprehensible. As the grown person walking with the child is so much taller than it, even if no force is put on the arm, it is fatiguing to keep it held up; and if one arm is always held, that shoulder may become higher than the other, and lateral curvature of the spine take place. Hence every now and then the hand should be changed, which will be a relief, not only to the child, but also to the nurse or mother. A better plan still is to have a set of toy harness, and hold the child by the reins, as the arms are not then dragged upon, but it is kept from running away and getting into mischief or danger.

Children are sometimes so roughly dragged across a crowded road that the arm is dislocated at the shoulder; they should be carried across, if too young to walk properly.

When they are able to walk and run, they should be allowed to do so, and should rather be encouraged to talk and laugh and shout during exercise, than scolded for it, for their lungs, as well as their muscles, will benefit by being freely brought into action.

Parents and nurses are too apt to applaud and encourage what they consider a decorous gait in their children. They like to see them walking quietly along, holding each other by the hand,

and hardly looking either to the right or to the left. This is, however, a most unnatural state of affairs, and as such is to be condemned. Upon all who are responsible for the lives and well-being of children I would urge the maxim which Thompson formulates in the following lines :—

> "Health is the vital principle of bliss,
> And exercise of health."

All unnatural positions, such as stooping, poking the head forward, standing on one leg, leaning towards one side, or holding the head on one side, should be discouraged, as they are likely to produce deformity. When, as is usually the case, the positions are adopted owing to local weakness, which renders them more comfortable than others, the little sufferer should be persuaded to lie on its back for several hours in the day, until it has grown stronger and the tendency has been overcome. Cases of deformity arise commonly in this way in ricketty children ; but in strong children bad positions are often adopted from a mere trick, perhaps acquired by imitation, which has been overlooked by parents and nurse, and may equally lead to deformity. Those who have the charge of children should be constantly on the watch for the first symptoms of bad habits, and, when discovered, they should at once set about to combat them ; for it is easy to prevent the acquirement of bad habits, but very difficult to cure them when they have gained a footing.

If one limb or organ is weaker than the others,

it should be strengthened by suitable exercises; and here I would allude to a practice which pervades the civilized world. The left side of the body in the majority is the weaker, and this is increased by the constant use of the right in preference to it. Thus spinal curvature generally takes place towards the right side, and the cause of this is the early and constant use of the right hand and arm in the preference to the left. Mr. Charles Reade, although ridiculed at the time, was perfectly wise in maintaining that the left hand should be trained to be equally useful with the right. The right side of the brain governs the left side of the body, and *vice versâ;* the parts of each hemisphere corresponding in their structure and functions to those of the other. Moreover, those parts which govern the action of certain muscles are developed by exercise of these muscles. The constant use of the right hand stimulates the hyperdevelopment of the left side of the brain; whereas, if the left hand were more used, the right side of the brain would increase in development, and such terrible loss of power as now takes place during injury to or disease of the left hemisphere would not be experienced.

Under the present *régime* the right foot is used in sympathy with the right hand, and when people stand long, the weight of the body is rested upon it, by which the length of the limb is diminished, as also the arch of the foot. To produce equilibrium of body and brain, the muscles of both sides should be equally exercised, and little children should be

taught from the first to use both hands indiscriminately, instead of being scolded for using the left. I have more than once seen children at table with their left hands tied behind them, so as to prevent the possibility of their using them. The sight was shocking to me, as an illustration of the folly that may be perpetrated in the name of precedent. The mothers themselves having been taught to use the right hand in preference to the left, continue to teach that doctrine, though it is a wholly unreasoning one.

CHAPTER VII.

CLOTHING FOR OLDER CHILDREN.

I SKETCHED in Chapter V. a new system of clothing infants, and if that plan be adopted no change in dress is required at the usual period for short-coating; this is a saving both in economy and in health, for such sudden changes as that from the ordinary long robes to the ordinary short ones are dangerous, especially at the time when it is usually made, namely, when the nervous system of the child is in a very irritable condition owing to teething.

Boys and girls should be dressed alike until the boys are breeched, and when they begin to walk a change may be made from the baby dress.

They should then wear next the skin a long-sleeved and high-necked vest, over this a high-necked flannel bodice, with or without sleeves, and fitting to the figure, to which the drawers and petticoat should be buttoned, so as to distribute their weight evenly.

The combination garment of vest and drawers

is very good, and then only the petticoat, which should be cut to a good length and made of warm all-wool material, need be fastened to the bodice. Socks should not be tolerated: they expose the legs and wriggle down into the shoes or boots, causing much discomfort to the wearer; but woollen stockings should be pulled up an inch or so over the ends of the drawers, and fastened with suspenders to the bodice. Garters compress the leg injuriously, interfering with the circulation. They increase the liability to chilblains, and have even been known, if worn very tight, to give rise to varicose veins.

The dress should be made high in the neck, with long sleeves, and to reach nearly to the ankles.

Charming little dresses for small children can be knitted or crocheted out of thick Berlin wool, and outdoor jackets made in the same way are very nice. They, like all children's dresses, should be made to reach throat, wrists, and ankles, not according to the absurd fashion of making dresses low where they ought to be high, and high where they ought to be low.

What is called the carter's-smock dress is very pretty. This is not lined, and is gathered into a yoke or shoulder-piece, so constructed that it stretches as the child grows. The hem is made wide, and tucks are put in the sleeves as further provision for that event. This costume is beautiful made in white serge and embroidered in washing silks. The infant's robes, of which I have spoken, may also be ornamented to an almost unlimited

extent with embroidery in washing crewels or silk, and can thus be made much more beautiful, artistically, than the ordinary babies' robe, which is simply a senseless mass of lace, insertion, frills, and fall-lals.

Boys should be breeched as soon as they begin to run easily. Jersey suits (see Fig. 3) are most healthy and comfortable, and may be worn from three years old till the child is six or seven. They stretch to every movement (Fig. 3), and are very durable besides being inexpensive; they should be worn with combinations and stockings, the warmth of which may be graduated according to the weather. Scotch suits for boys, which are so fashionable and so much admired, are an abomination owing to the way in which they expose the legs.

Fig. 3.

I know a curious instance of a little boy six years old who wears a Scotch dress, his legs have never been covered since he was an infant. As an infant he was one of the finest children I have ever seen, and has always enjoyed good health, yet he has hardly grown an inch, nor increased in weight since he was three years old. His mother often complains to me of his smallness, and asks what she can do for it, to which I always answer "cover

up his legs." And then I cite the case of his little sister, who being a delicate child had always had her limbs well protected, and is now about the best grown child of her age that I know. Yet I cannot make that lady understand the influence which to my mind has determined the development of these two children. She cannot or will not believe that the saving of heat in the one assisted her growth, while the other's constant loss of heat hindered his. And yet all the other conditions affecting the two children are so identical that I positively cannot assign any other cause for the difference between them.

It is no less instructive than interesting to observe what a marked increase takes place in the growth, and improvement in the health, of boys, when from the ordinary improper clothing of young children they are promoted to the trousers or knickerbockers and stockings, with the jacket and waistcoat of schoolboy life. The body is now properly covered, and a quantity of food material formerly used up to develop heat is now appropriated to the purpose of growth. The trousers are supported by fitting closely over the hips and by braces, which help to distribute their weight; the cut of the jacket and waistcoat permit the arms to move freely, and the chest is not compressed in any way; whereas formerly, the dress cut low in the neck (see Plate 5, line C, D), slipped down on the shoulders, binding, as it were, the arms to the sides, and preventing the full expansion of the lungs. The boy can now stand erect, and his arms,

instead of hanging forwards as before, will incline backwards, his chest will grow broader and his back narrower, and his face bright and rosy with the improvement in circulation and breathing. On first standing erect he may feel somewhat stiff, owing to the previously unexercised muscles of the chest and back being brought into forcible action; the same feeling is experienced by adults, accustomed to stoop, when placed erect.

Fig. 4.

A very pretty and nice dress for boys when breeched is the sailor's suit (see Fig. 4), which, by its looseness, allows free movement, is very durable, and covers all the limbs. The jacket must not, however, as is sometimes done, be cut low in the neck, or, if so cut, it must be filled up with a thick white flannel, so as to keep the warmth equal.

Under the suit flannel drawers and vest or combinations should be worn. Sailor suits should, however, be made with trousers, and may be worn till the boy is old enough to wear ordinary trouser suits.

The artist in mistake represented knickerbockers in the above illustration.

It is a pity that little girls as well as boys should not enjoy the freedom of Jersey knickerbocker and sailor suits; but prejudice is against this at present.

Skirts made to the ankles would protect little girls' legs; but the disadvantage of long skirts is, that they are in the way when children are running and romping as they ought to do. About the best dress I know of for girls from three years upwards consists of a sort of smock over a divided skirt. Next the skin combinations of thick or thin material, according to the weather, should be worn.

Fig. 5.

Fig. 6.

Next this a flannel body, on to which two sets of buttons are sewn, one above the other, to the lower buttons the suspenders of the stockings, which should be woollen, are to be fastened; to the upper buttons the divided skirt is attached (see Fig. 14 on p. 172); over this comes the smock which completes the costume.

Figures 5 and 6 are pretty dresses for little girls,

and may be worn over the divided petticoat as described. Fig. 6, suitable for a girl from three to eight years old, may be made of blue serge trimmed with white, or of white trimmed with blue, or of Jersey material. Fig. 5 is suitable for a girl from eight to thirteen, the skirt being lengthened in proportion to the age.

Bonnet or hat and stockings may be made to match the material of the dress, which is as pretty as it is healthy. Dressed in this way girls can romp about or go in for gymnastic exercises with the utmost freedom and comfort.

If the skirt is made to fasten at the side, like buttoned drawers, it is a suitable and modest garment for girls who romp with their brothers, or go in for climbing and gymnastics, as nearly all girls ought to do. This sort of dress can be made very easily and cheaply if one has a pattern, or bought at quite a moderate price, and if it were only generally adopted by the little girls of to-day a vast difference would be found between the health of the young ladies of ten years to come and those of the present time. Moreover, girls who in childhood had been clothed in this way would never submit when grown up to the unhealthy and uncomfortable forms of dress which are generally dictated by fashion.

As I recommend that the little ones should always be clad in woollen materials, and preferably in white, it is necessary that care should be taken to protect their dresses when at meals or at play. For this purpose an overall pina-

fore, like that shown in Fig. 7, made of coloured cotton, may be worn. The illustration represents a very pretty one trimmed with Madeira work or Swiss embroidery.

Fig. 7.

In choosing materials for clothing, care must be taken to avoid weight while securing warmth; and, above all, they should be inexpensive and strong, so that the child may not suffer from being forbidden healthy play lest its clothes should be spoiled. It must be a poor sort of mother's love—and yet it is a very common one—which prefers the welfare of the clothes to that of the child. If a woman wants a block to set fine clothes on, let her get one made of wood or wax, but not turn her little boy or girl into one.

In a later chapter I shall have to refer to the question of reform in the matter of corsets and tight-lacing; but, as I have already urged, reform should begin with the infant. Let us then be sure from the child's earliest days that no external pressure of garments shall hinder its natural and healthy development; and if, combined with this negative advantage, there be the positive one of a liberal amount of physical exercise, we shall be the means

of giving to our children erect frames, clothed with firm flesh (or muscle), which will scorn the use of artificial support.

In a former chapter I urged "the total abolition of the binder," and I have now to plead against the use of those baby stays with which so many little ones are provided. Here mothers will exclaim, "But what harm can they do? They are not at all stiff. Why, they are only made of corded jean, or something of that sort." The answer is: They can do harm in many ways.

In the first place, if they are not stiff they are unyielding, and thus not adaptable to the changing proportions of the little body. That body, moreover, is all "straight down alike," to use common parlance; hence, if the stays are loose, they slip down and press on the pelvis, crushing the surrounding soft parts, and possibly deforming the bony structure, which during childhood is cartilaginous and easily bent, thus creating a source of misery for the girl's future. Since the stays thus tend to slip down, mothers are inclined to tighten them somewhat, "just to give them a little grip, you know," and in this way the evil of tight-lacing is initiated; or shoulder straps are added, for the purpose of keeping them in place, and these give rise to stooping by dragging on the shoulders, and not unfrequently to curvature of the spine.

The too common custom of pinching in the waists of growing girls has most probably arisen from the difficulty of keeping their clothes, as ordinarily constructed, from slipping down. The diffi-

culty is a real one, but it can be overcome by a more rational plan of fastening clothing and a more even distribution of its weight. If stays are not worn, petticoats and drawers are fastened round the waist with bands or strings, and have to be fastened tightly, or else they would slip over the narrow hips natural to girlhood. This is both uncomfortable and hinders natural growth; but in the majority of cases stays are worn, and are tightened at the waist to "give a grip" in very young children when the drawers and petticoats are buttoned on to them, and in older girls to make the hips a basis of support for those garments, which are then fastened round the artificially-formed waist.

When girls are old enough to dress themselves, although they would not willingly compress their bodies, they may adjust their stays loosely enough at first, but carelessly, and in ignorance of harm, they may not let them out for months; and thus, although the girls grow bigger, the stays do not, and compression takes place almost without their being aware of it. An inelastic corset effectually hinders the gradual enlargement of the body of a growing girl, and presses on her soft bones like a vice. At no period of life is pressure on any part of the body so terribly injurious as during the period of growth, for not only are the bones soft and easily deformable, but every organ of the body has its duty of development to perform, and this development is cramped and hindered by external compression. To take an analogy from the vege-

table world, you cannot expect a fine plant to grow in a pot too small for it.

As pressure on any part is injurious, it at once becomes obvious that it will not be right simply to remove the pressure of the clothes from the waist and suspend their whole weight from the shoulders, as is frequently done; for this is a cause of stooping, of poking forward of the head, and of spinal curvature. The great desideratum is to distribute the weight of the clothes evenly, which may be done by wearing union garments fitting rather closely to the figure, or by supporting petticoats and drawers to a well-fitting bodice such as I have already described, and shall say more about hereafter.

The subject of shoes and boots for children is one of great importance, as the vast majority of feet are deformed by the custom of wearing badly-fitting and badly-shaped boots.[1]

The infant's shoe, made with a strap round the ankle, is good if made in the way I am about to describe; but if the child's legs or ankles are at all weak, high boots should be worn both indoors and out. As soon as the little one begins to walk it needs more protection to the feet than the woollen stockings I have described. The boots and shoes should then be made of what is called "glove" kid—a soft and yielding material. They should fit exactly on the foot, as too roomy a boot chafes both stocking and skin, causes corns,

[1] See Chap. XIV.

and allows the foot to turn over in walking. The inner margin of the boot or shoe must be made straight to the line of the big toe, and the toe of the boot must be wide enough to allow movement in the child's toes. The waist of the sole, which corresponds to the arch of the foot, should be to a certain extent elastic, and, if any heels are worn, they must be broad, low, and under the natural heel.

There must be no roughness on any part of the inside, or corns will result; and the boots must be given up directly they are beginning to be outgrown. They should be laced or buttoned, and should cover the ankle so as to give it support. This is especially important for children inclined to be ricketty, and for such weak legs the boots should be made very high, and only taken off when the child goes to bed. In decided cases of rickets inch-broad strips of thin steel may be inserted between lining and leather from the top of the boot right down each side of the ankle; these may be made as high even as the knee, and will be found more comfortable, being very much lighter than the irons usually worn for incipient bandy legs. Not only does deformity result from the use of improper boots, but from the discomfort arising from them the natural activity of childhood is impeded, and the whole constitution suffers accordingly.

However desirable economy may be, it must not be practised in the following cases, for then it would be injurious to health. We must not grudge paying our laundresses' bills, or if we cannot afford to

have every article worn by our children washed twice or thrice a week, we must turn up our sleeves and wash them ourselves.

The choice of children's clothing should never be left to nurses or outfitters; but the mother, be she never so rich and fashionable, should superintend it herself, so as to be sure that every garment worn by her little ones is both healthy and comfortable.

We must never let children wear clothes they have outgrown. Boots must always be made to fit, by good makers, and of the expensive material I have described—what is called glove-kid, and each child ought to have two pairs, which should be worn on alternate days, in order to prevent that moulding of the foot to any peculiarity in the shape of the boot, which may happen if it is worn constantly.

The little ones must have clothes suitable for every kind of weather, so that they may never be kept indoors because they have nothing fit to go out in. They must have changes of clothes in case they come in damp. And last, but not least, however great the damage may be to clothes, nothing must induce us to interfere with the little ones' romping play.

From the foregoing it is clear that the first principles to be obeyed in the clothing of children are the prevention of undue loss of animal heat by the use of apparel so contrived that it shall not hamper their movements; and CLEANLINESS. Both these principles may be obeyed equally by rich

and poor: for clothes may be made even more easily on a rational plan than in the common way, and soap and water are decidedly inexpensive; but people must devote time and thought to the subject.

By the observance of the broad principles which I have endeavoured to lay down, it will be possible to avoid the snares of prejudice and old-fashioned customs more honoured in the breach than in the observance, but which unhappily are now too widely adopted. It will be possible, by intelligently watching the necessities of child nature, to provide for its contingencies, and thus obtain the most favourable conditions under which children can start on their life-career, so that they may become strong and healthy men and women, and useful members of society, instead of puny hangers-on at the skirts of life.

CHAPTER VIII.

COLOUR OF MATERIALS FOR CLOTHING.

I HAVE dwelt at great length on the subject of healthy clothing for children, not only because, in relation to this question, childhood is decidedly the most important period of life; but also because many of the principles explained are perfectly applicable in the case of "children of a larger growth," concerning whom I shall speak further on. To both sexes, and all ages, also apply the remarks as to the colour of clothing materials, a question of great importance in relation to health, which form the subject of the present chapter.

The most healthy colour is the natural colour of the wool, which varies so much that pretty tweeds may be made from a mixture of shades, and of these, pretty walking dresses and outdoor garments, as well as good lounge and shooting suits, may be made. White, however, which is obtained by bleaching, may be worn with great advantage, both in summer and winter; and no dyed garment should ever be allowed to come in contact with the skin. An objection is generally raised to white

clothes, that they have to be changed too often, as they get dirty so soon. But instead of this being an objection, all physiologists would consider it a great advantage.

Of course, it is absurd to imagine that white gets dirty sooner than any colour: it simply shows the dirt more. From the dust of the surrounding air, and from contact with dirty surfaces the clothes take up constantly a certain amount of impurity; but besides this outside dirt, they absorb a great deal of those refuse matters from our bodies, of which I spoke in the second chapter. Every day over two pints of dirty water pass through the pores of our skins in the form of sensible and insensible perspiration. In this dirty water there is about a quarter of an ounce of absolutely poisonous matter, and with it is mixed the oily excretion given out from the sebaceous glands. The chief part of all this refuse and impurity is taken up by the clothes, especially under our present system of clothing.

Now from all this it is clear that, if clothes are not frequently changed, people are, in a manner, poisoned by their own excretions—a fact which Dr. Richardson has formulated in his saying, that "Health will not be clothed in dirty raiment."

I have now to mention a rather unpleasant truth, namely, that there is a natural tendency in the human mind not to be ashamed of sins which are known only to the sinner himself, or which can be concealed. A crime is not a crime until it is found out. The same tendency obtains in small

as in great matters, so people will wear, and allow their children to wear, clothes thoroughly impregnated with filthy and poisonous matters—as dirty as they can be—because, forsooth, they are of a dark colour, and people cannot see that there is anything wrong with them. Thus dresses and coats, and trousers and petticoats may be worn unconcernedly for months, when, if their colour had only been white, their wearers would have been ashamed of their dirty appearance in less than a week, and they would have been speedily despatched to the laundress's or cleaner's.

Clothes can hardly be changed too often, and if they are made of white materials we are constantly reminded of that fact. Moreover, dyes bring new dangers, as poisonous matters are often employed in the processes of dyeing. For instance, every one has heard of the use of arsenic in dyeing, and although I believe it is not now used so much as formerly, it is just as well to be on one's guard against it. It is arsenic which produces that beautiful bright green known as Scheele's green.

The colouring principle of the aniline dyes, of which the worst are the red and yellow coraline, is a very active poison, and produces an eruption on the skin, which has more than once been mistaken for erysipelas, but which disappears when the irritating cause is removed. Some time ago Dr. Woodland called attention to a number of cases of eruptions on the legs and feet, for which he had been consulted. His suspicions were aroused by finding all the patients had worn red

stockings, and on analyzing these he discovered a compound of tin, which had been used as a mordant in fixing the dye. Each time articles dyed in this way are washed, the tin salt becomes more and more soluble. The skin excretions attack the oxide of tin, and thus a poisonous compound is formed. Some colouring substances unite directly with the fibres of the material to be dyed, and require no *mordant* to make them *fast*. Indigo is one of these so-called substantive colours, so indigo-blue is a very safe colour for your own or your children's clothes. But nearly all vegetable colours require mordants, and the principal mordants are salts of iron, tin, and alumina.

Notwithstanding the fact that salts of tin are commonly used in red dye, such is the general ignorance on the subject that it is frequently worn next the skin by preference. In underclothing shops, even in some of the most fashionable, red flannel vests and drawers are sold with the greatest complacency as being "very good," and "recommended by the faculty," or "anti-rheumatic," and in every chemist's shop we see dozens of "chest protectors," made of material dyed with this poisonous stuff, in spite of the fact that, so long ago as 1876, Dr. Richardson published a case of disease resulting from the wearing of such a "comforter," together with some strong censure of the use of the aniline dyes.

There is a sort of idea that red flannel possesses some mysterious curative properties superior to any other colour. As example of this popular error,

I remember being very much struck by a highly educated gentleman, who was suffering from a severe cold on the chest, informing me that his mother had told him to put on a thick red flannel next the skin, and that if the flannel were not red it would do him no good. I have noticed also that among the poorer classes red is decidedly the favourite colour for children's clothes; and I fancy I am about right in stating that of patients applying for relief at children's hospitals, nine out of ten will be found to be wearing some article of clothing coloured red.

At the recent Health Exhibition Mr. Startin, of St. John's Hospital for Skin Diseases, showed a very interesting series of articles which had produced diseases of the skin through the poisonous colours employed in dyeing them, and concerning these he made the following remarks, which I quote in full, as they are at the same time both true and lucid:—

"During the last few years," he said, "articles of dress, especially those worn next the skin, such as stockings, socks, gloves, drawers, &c., have been coloured with dyes derived from coal tar, amongst which are magentas, reds, violets, blues, and yellows of great beauty. And so long as they are worn externally they produce no impression save admiration; but their application to articles of dress, such as named above, and worn in contact with the body, has shown that they are capable of producing irritation and eruptions of the skin, and in some instances constitutional disturbance.

Many of these aniline dyes, as they are called, are derived from benzol and other products of coal tar, from which are obtained reds, blues, and magentas of great beauty, some of which, when brought into contact with the skin by means of the perspiration, act as powerful irritants, more in some instances than others. The dye is soluble in the perspiration, and hence it becomes absorbed into the skin. Some of the magenta dyes also contain arsenic, that compound being used in their preparation. It sometimes happens that the colour and pattern of the sock is transferred to the skin, and is represented by lines and figures of inflammation. This inflammation is sometimes propagated to different parts of the body in the same individual, and is often of a very severe and intense character; and still greater annoyance often results by reason of its recurrence after the skin has apparently recovered."

A typical case was mentioned in the correspondence on the subject of the injurious effects of aniline dyes published in the *Times* during August, 1884. After wearing red silk stockings a lady found the colour transferred to the skin of the parts covered by them, her feet became very inflamed, and on consultation the physician informed her that her trouble was the result of poisoning from the dye of her stockings.

Among cases of poisoning from gloves, socks, shoe-linings, &c., Mr. Carr mentions that of a young woman whose business was to cut out dyed goods. An interesting case is recorded by Dr. Myrtle, of

Harrogate, whose patient had for some time been wearing stockings of a deep red colour, and suffered from large inflamed blisters. Treatment was given for several weeks, and the stockings discarded, but the trouble remained. Then Dr. Myrtle discovered that she was wearing slippers lined with magenta flannel, which kept up the irritation. After the removal of the lining she soon recovered.

Apropos of this case, Dr. Myrtle remarks that he has had several cases where mauve-dyed articles of clothing have produced great local irritation, which in one or two cases has proved not only painful, but most difficult of cure. Neckties and socks have furnished obstinate forms of an eruption of an herpetic character, the base of each vesicle being painful and greatly inflamed. The eruption has, in appearance and nature, resembled shingles more than anything else, although it is, as far as my observation goes, a distinct form of skin disease.

Dr. Blair, of Goole, has mentioned a case in which a lady, after wearing a pair of bronze-green silk gloves for a day or two, was attacked with a peculiar blistering and swelling of both hands, which increased to such an extent that for three weeks she was compelled to carry her hands in a sling, suffering acute pain, and being unable to feed or dress herself.

Arsenic is used in preparing some aniline dyes, and clothing dyed with them may thus exercise a harmful influence on the wearer. An agitation took place in Germany in 1884 for the purpose of prohibiting their use by parliamentary action; but I do not

know whether the decree has yet gone forth for their abolition from the manufacture of clothing.

Symptoms of arsenical poisoning are drowsiness, weakness, internal pain, severe depression, swelling of the throat, feverishness, and—which is very important—a metallic taste in the mouth. All these symptoms have been produced by arsenical wall-papers, and would probably result in an increased degree from arsenic in clothes, but in this case perhaps the cause is not so likely to be suspected. There is a popular idea that green is the only colour in the production of which arsenic plays a part; but this is a great mistake, for not only can good greens be obtained without the use of arsenic, but very many other colours, such as red, yellow, mauve, fawn, magenta, brown, blue, and even innocent-looking grey and white, are frequently obtained by its use. Hence it is not sufficient, in order to escape the risk of poisoning by arsenic, simply to avoid certain colours, but samples of wall-papers or dress materials should be chemically tested for the poison. The public analyst or some chemist can be applied to, or the following test, called Reinsch's test, may be employed:—

Cut the suspected substance into small pieces, and place them in a test-tube half filled with a liquid consisting of one part of hydrochloric acid to four of water. Light a spirit-lamp with a moderate flame underneath the test-tube. Take a small piece of copper foil, brighten it by rubbing with emery or glass-paper, and through a hole in one end fasten a fine platinum wire. As soon as the

liquid boils insert the copper into it, and lower the flame so as to maintain only a gentle simmering. By means of the wire the copper can be drawn out from time to time to examine the progress of the test.

If much arsenic is present the copper will almost immediately be coated with the colour of *lampblack* or *dark steel*; if there is less arsenic, a period varying from half a minute to half an hour, which is the extreme time, will be required. If after that limit the copper is not coated all over as above, the material may be accepted. This process, however, while *negatively* proving the absence of poison, does not positively prove its presence, for the coating may arise from a few other ingredients present in the colouring matter, such as mercury or sulphur. As these ingredients, however, may also be injurious, it is as well to reject the wall-paper or clothing material when the coating is observed. Arsenic is used in linen glaze, and paper collars and cuffs, and, as before observed, is largely used in the preparation of aniline dyes, but if properly managed does not pass into the "finished" dye. Hence the painful and irritating effects produced by articles of dress dyed with aniline colours, are generally caused by the dyes themselves when improperly fixed. Aniline is a narcotic poison when taken internally, and a local irritant if applied to the skin, so that the dyes derived from it may participate in its poisonous qualities. Aniline colours are largely used in artificial-flower making; and M. Napias, in a paper read before the Paris Society of State

Medicine, observed that he finds makers of artificial flowers who use quantities of aniline dyes suffer from symptoms of lead-poisoning, particularly those who use "geranium red," which contains 20 per cent. of lead. Thus aniline dyes, though so greatly praised for their beauty, are not the unmixed good which some pretend them to be.

As regards dyes, light colours are more healthy than dark, since they contain less colouring matter, and fast dyes are safer than those which fade rapidly. Indigo-black is a very "fast" dye, and is therefore better than blacks obtained from logwood. Logwood has a peculiar effect well known by dyers, in that it deprives the skin of the sense of feeling.

Dyed materials are least injurious when there is least perspiration, and they should be especially avoided for dresses to be worn during exercise. White, therefore, besides being the prettiest, is the most healthy colour for summer and evening dresses.

"Fast" colours are safe, owing to the fact that they are less liable to be decomposed by the perspiration. The best way of ascertaining whether or not a material is dyed "fast" is to wash a small piece of it, and notice whether the colour comes off in the water or on to your hands. Colours which "come off" should be avoided, as, even if they do not come in contact with the skin, particles of them enter the body with the breath, and if the dye is poisonous they act injuriously in that way.

Some interesting experiments as to the value of

various colours for use in tropical climates were made in the Soudan by the war correspondent of the *Lancet*. Two thermometers were placed in wooden boxes, one of which was painted black, the other white; they were left in the sun for one hour, at the end of which time the thermometer in the black box registered 117° F., that in the white 102° F.

In another experiment six thermometers having two parts of new bunting of various colours wrapped round them were hung up exposed to the sun for one hour, with the following results:—

Temp. of the air in shade	. . .	91° F.
„ thermom. covered with	white .	106°
„ „ „ „	yellow.	109½°
„ „ „ „	red .	100°
„ „ „ „	blue .	114°
„ „ „ „	light blue	115°
„ „ „ „	black .	117°

Ten tin biscuit-boxes painted as below were exposed with thermometers standing up in them on the sides opposite to those turned towards the sun. Temperature of air in the shade, 88° F. They were closed and left for about two hours. They registered as follows:—

1. White . .	100° F.	6. French grey	106½° F.
2. Yellow .	103½°	7. Lead colour.	109°
3. Red . .	104°	8. Dark green .	110½°
4. Stone colour	102½°	9. Light green .	109°
5. Blue . .	106°	10. Black . .	114°

Three square tin biscuit-boxes were next painted and whitewashed variously.

RESULT.

A.a.	Painted white and exposed to the full rays of the sun	100° F.
	Painted French grey ditto ditto .	111°
	Painted dark grey ditto ditto .	112°
A.b.	Painted with one coating of grey over white	108°
	Painted with two ditto ditto .	116°
	Painted white and exposed to the sun .	100°
	Whitewashed ditto ditto .	98½°
B.	Biscuit-box painted French grey . .	111°
	Over this one coat of whitewash . .	102°
	With two coatings ditto . .	96°
C.	Biscuit-box painted lead colour . .	112°
	Over this one coat of whitewash . .	103°
	With two coats ditto . .	97°[2]

According to Dr. Parkes the material of clothes is of no importance as far as regards protection from extreme heat in the form of direct solar rays, and colour must be trusted to in this respect. White has the greatest protecting power, then grey, yellow, pink, blue, and lastly black. On the other hand, in the shade colour does not markedly protect against heat, and the thickness and non-conducting character of the material worn must be depended on.

[2] *Lancet*, May 9th, 1885.

CHAPTER IX.

GIRLS' CLOTHES.

THE ideal of beauty in dress which I set forth in the opening chapter is, I fear, far from being common at the present time, and we find much weakness, suffering, and ill-health consequent on the neglect of its precepts. Women, and more especially growing girls, suffer much—first, from insufficient warmth of clothing; secondly, from the weight of clothes hanging mainly from the waist; and, thirdly, from the pressure on the lungs, heart, and other internal organs, caused by bands and garments too tightly made.

It may be thought strange that in such a book as the present, which will, I suppose, be read chiefly by the wealthier portion of the community, I should refer to insufficient clothing as a source of suffering, yet it is true.

Most girls wear short skirts up till the age of about fifteen, and in quite cold weather, as a rule, their legs and feet are only covered by thread, silk, or crape stockings, and calico drawers under loose skirts. The middle part of the body is, however,

overheated, for it is covered by the tops of the petticoats and drawers fastening close round with bands, by the stays, chemise, and sometimes vest. The neck and arms are, as a rule, quite as badly protected as the legs, for they have only the thickness of the dress over them, as the vest and chemise are cut low in the neck and short in the sleeves, and high petticoat bodices are not always worn.

If we compare this dress with that of a young man we find that the male has greatly the advantage in matter of comfort. He generally wears woollen socks, drawers, and vest with long sleeves and high neck, and his outer garments clothe him completely and with an even warmth all over. I do not say that men's dress is perfect in comfort, but the balance is decidedly in favour of the male attire.

As to the weight of girls' clothes, it is quite common to see a young girl, who, as it is sometimes said, is outgrowing her strength, and whose spine can scarcely support her head and shoulders erect, dragging herself wearily about in a dress, the skirt of which alone weighs some pounds, This has possibly been bought for her with the mistaken idea that the heavier a material is the warmer it must be. The mistake, however, is a serious one, as heavy materials generally owe their weight and substantial appearance to admixture with cotton and fibrous rubbish, some stuffs being, as it is called, "loaded," in order to deceive the public as to their value. All-wool materials, if genuine, are *light* in proportion to their warmth.

The chief evil, however, of ordinary dress, results

from the way in which it is supported, pressing upon the waist (see Plate 5, line A, B), hindering the development of the internal organs and cramping them, thus tending to produce injuries which may affect the happiness of the girl's future.

I believe that a large number of the cases of curvature of the spine met with in surgical practice, generally in girls between the ages of twelve and sixteen, result directly or indirectly from the weight and improper pressure of clothes, a potent agent in causing the deformity being the wearing of high-heeled boots, which throw the body forward in walking. Tight, stiff stays are responsible for a great deal of harm, and I am afraid that horrible process called tight-lacing begins but too frequently earlier than is generally suspected.

I propose to deal with these evils seriatim, and show how best they may be avoided.

I have already given what seem to me sufficient reasons for maintaining that wool is the natural and most healthy substance out of which to manufacture clothes. Clothes in their action should be merely supplementary to the skin, and care is required to enable them to properly perform the functions demanded of them. They should be light, warm, permit free transpiration, or, in other words, ventilate well; they should exert no pressure on any part, and they should be free from all poisonous particles, whether of dirt or of dye.

Our bodies lose heat by evaporation, and also by conduction, convection, and radiation. We, therefore, require our clothes to be absorbent, so that

the evaporation shall not take place on the skin, but from the surface of the clothes, which prevents chill. The mere fact of covering impedes loss of heat by convection, and radiation, and provided our garments are made of non-conducting materials they necessarily minimize that loss of heat by conduction which is always going on between two bodies of different temperatures, such as the human body and the air, just on the same principle that a tea-cosy retains heat in the tea-pot. We stuff our tea-cosies with wool in perhaps unconscious obedience to the principles I have explained, and we should clothe our bodies in the same way.

Stationary air, as has been observed,[1] is a bad conductor of heat; but particles of air rise, when heated, and give place to colder ones. Hence it is desirable that the covering of the body should have a rough surface, so as to entangle in it particles of air, which becoming heated, and being unable to rise, form a sort of warm atmosphere round the body. It is an advantage, moreover, for garments to be loosely woven, so that a certain quantity of air may be entangled in the meshes of the material, and for the same reason, instead of the clothes consisting of one very thick garment, successive layers of clothing are and should be worn, as a considerable amount of air is then imprisoned between them.

The human body has a tiny atmosphere clinging to its hairs, in proportion to their size, as may

[1] P. 35.

be seen by plunging the hand quickly into water, and then holding it still, when little silvery bubbles will be seen on the skin. But in other animals better covered than man, air adheres in considerable quantities to the thick hair, fur, wool, and feathers, adding to their warmth-saving capabilities, and here again wool is indicated as a most suitable clothing material: for cotton, linen, and silk, having smoother surfaces, do not provide so protective an atmosphere.

Nature points to wool as the proper clothing of man, as of the lower animals, and, as is only to be expected under the circumstances, it fulfils all the conditions necessary for the preservation of health, as far as dress is concerned; it retains more warmth, while weighing less than any other material, and it allows the skin to perform those functions of transpiration, interference with which is the precursor of disease, while stoppage of them causes death, as surely as the cessation of breathing through the lungs, consequent on suffocation.

To speak now of the ventilating power of various materials. It might appear at first sight, and is, indeed, often maintained by the thoughtless, that the more impervious to air a material is the warmer it must be; but experience teaches us that this is not so. For instance, a kid glove, which can hardly be said to allow any air to pass through it, feels by no means so warm on the hand as one knitted out of wool, through which a great amount of air can pass, as may easily be seen by blowing through it. If we call the ventilating power of flannel 100, that

of linen is 50, of silk 40, and of buckskin 1 ; but a practical comparison of the heat values of these materials shows that flannel feels decidedly the warmest when worn. Of course it may be said that it feels warmer because it is a better non-conductor, but I believe another cause for this effect may be found in its higher ventilating power. I said in a previous chapter that the skin breathes as well as the lungs, though in a less degree, and if the air is permitted to reach the skin it not only removes waste and injurious substances from the body, but it also gives oxygen to the body. This oxygen combines with the carbon in the small blood-vessels, which in countless multitudes underlie the skin, and heat is given off.

Speaking of these little blood-vessels leads me to mention another point about clothing, namely, that if clothes fit too tightly they are not so warm as those of looser make, and the reason of this is two-fold. First, tight clothes press upon the little blood-vessels in the skin, and thus mechanically interfere with the circulation of the blood in them, and that hot fluid, the blood, not being permitted to flow to the skin, that organ feels the loss of its heat supply. Secondly, tight garments, permitting but little air to lie between them and the skin, do not so freely permit the interchange of those good offices of which I have spoken, between it and the air, as would looser garments.

The value of woollen clothing for occupations or sports which bring about copious perspiration is generally acknowledged, and the reason of this is

that it permits the skin to dry rapidly by absorbing moisture, and does not cling to the skin wet and clammy like cotton or linen. Wet clothes conduct heat away from the body more rapidly than dry ones do, and if two men, one wearing a flannel and one a linen shirt, after a vigorous game of lawn-tennis sat down to cool, the one wearing flannel would probably suffer no ill results, while the linen-clad hero would soon feel a sudden chill, and would speedily develop all the too familiar symptoms of cold in the head, or on the chest, or of sore throat. By absorbing much of the perspiration woollen clothes prevent the chilling of the body which takes place when evaporation is too rapid.

But, besides wearing woollen during athletic sports, most men wear woollen vests, drawers, and socks—at any rate during the winter; yet our young girls, who are infinitely more in need of every advantage that clothes can offer, for the most part are allowed, even in the coldest weather, to wear cambric or cotton underclothing, in spite of the fact that most medical men are agreed that woollen underclothing is necessary in this climate.

My own opinion is that woollen should be worn not only in winter but in summer also, the only difference being in the thickness of the make and number of the garments, and I am led to believe this by the physiological facts which I have stated.

Woollen garments, if themselves kept clean, preserve the skin in a clean and healthy condition, keeping it warm in winter, and preventing chill in summer.

That irritation which sometimes follows the unaccustomed wearing of woollen next the skin is generally caused by the material being of recent manufacture or coarse quality, and in all but the rarest cases it passes off within a few days, if the practice is persevered in.

In those rare cases where irritation continues if all-wool garments are worn next the skin, a mixture of cotton and wool, as in the ordinary "shop" merinos, or of silk and wool, as in the Anglo-Indian gauze, which is perfectly smooth, may be worn.

In summer weather I believe that many cases of so-called nettle-rash, and that most painful skin disease, prickly heat, the name of which admirably describes the sensations it produces, are caused by the sudden checking of the functions of the skin, owing to the thinness of the vests worn. These cases are not often met with in medical practice, as, although extremely painful, the affections are known not to be dangerous; but I believe they are much more common than is generally thought, and privately I have met with several in the persons of young ladies who in summer wear calico next the skin.

A typical case has been recorded[2] by Mr. Wharton, whose patient, himself a medical man, suffered tortures every year, from May till November, from prickly heat (*lichen tropicus*). His sufferings were aggravated by increase in the action of the skin, and all treatment availed

[2] *Lancet*, August 2nd, 1884, p. 190.

nothing. "At last," said Mr. Wharton, "it occurred to me that perhaps the light, short-sleeved India-gauze vests that he wore in summer had some share in the causation of his agony; they were too thin either to absorb the perspiration, or to protect the skin from sudden chills. . . . I accordingly advised him to wear throughout the summer the thickest long-sleeved vests, made entirely of wool, such as he wore in the depth of the winter. The result was the absolute cessation of his experience of 'prickly heat.'"

There is a very prevalent idea that woollen clothing is weakening, but this is only a misapprehension of the fact that it is weakening to allow the body to be constantly overheated. Although woollen is worn, the body need not be overheated, even in summer, care being taken that the quality and quantity of the clothes is suitable to the external temperature.

To come now to the practical application of all the principles which I have endeavoured to explain in this and the preceding chapters, I recommend that the body, especially of growing girls, should be clad entirely in wool, and for this purpose I advocate the use of woollen combinations, with high necks and long sleeves. The combination garment, with the addition of woollen stockings, forms a complete and most sanitary costume, and, were it not for the sake of appearances, is all that is needed for summer wear; but other clothing is required in winter for warmth, and in summer for the sake of that tyrant appearance.

If any objection is raised against combinations, on the score that it is dangerous to change them at night, and unpleasant to sleep in drawers, woollen vests may be worn, and drawers of the same material fastened to the stays or the bodice hereafter to be described. The vests can then be retained for night wear, and the drawers taken off with the other clothes. Many people, however, think it advisable to change the underclothing at night, and I have heard this especially recommended for consumptives, on the grounds that, after having been worn all day, the underclothing is, as it were, poisoned by the excretions of the wearer. If this is done, great care is needed in order to prevent chill. It must be borne in mind that on retiring to rest, and throughout the night, the human body is at its minimum of power. Worn out with the day's exertions, the nervous system is exhausted, and more liable to be injuriously affected than at any other time, and we must not forget that cold acts through the nervous system. During sleep, moreover, when the vital forces are being renewed, the functions of the body go on more slowly than while we are awake, the heart beats less quickly, and less heat is evolved, as may easily be seen by taking the temperature of a sleeper with a clinical thermometer. The temperature of the atmosphere also falls at night, and sometimes very suddenly and considerably, so that even greater care is required as to night clothing than as to that worn during the day. I would lay down as a hard-and-fast rule that, unless

the temperature of the bedroom reaches or exceeds 60° Fahr., the garment worn next the skin should not be changed at night, except, of course, in the case of those very strong people whom nothing seems to hurt.

If the woollen vest is changed, its place must be supplied by one of equal thickness and warmth. It is also desirable that nightdresses should be made of wool instead of the orthodox cotton or linen; they can be made extremely pretty by the aid of embroidery in silk. For cases of disease such as rheumatism or ague it has long been recommended for the patient to discard the use of cotton or linen sheets, and sleep between the blankets, a tacit acknowledgment of the principles regarding the relative values of animal and vegetable fibres, which I have explained in former chapters.

Just as it is desirable, in the interests of health, that wool should be used exclusively for clothing during the day, so it is that the surroundings of the body during the night should be of wool, and the bed or mattrass, being, as it is generally supposed to be, stuffed with hair, wool, or feathers, should be cased in woollen material. Many people, when, travelling, they are obliged to sleep in strange beds, are actuated by the fear of damp sheets, and wisely elect to sleep between the blankets; and although this would not be considered comfortable by the fastidious, such beautifully soft and smooth materials are now made of wool, that there is no reason why woollen sheets should not be sub-

stituted for linen or cotton ones. Expense may, perhaps, be an obstacle, for neither pure woollen materials nor unadulterated bedding can be sold for a low price; but after all it is only the initial expense that has to be considered, and that is outweighed by the personal advantage to be obtained, for

Health is the first wealth.

Soon after the publication in the *Queen* of my articles on "Healthy Dress for the Little Ones," which form a part of Chapter VII. in this volume, a correspondent, signing herself "Northerner," wrote to the paper as follows:—

"I cannot agree with Miss Ballin, when advocating high-necked and long-sleeved woollen combinations for little girls. Once begun, they could never be left off. Fancy a girl accustomed to them up to her, say seventeenth year, and then, on her 'coming out,' obliged to wear a square or low gown. Surely she would run more than double the risk of catching cold than a girl accustomed all her life to a low-necked vest. Of course, woollen combinations may be healthier; but, as long as fashion continues as it is, girls should (if they feel the cold) wear high flannel bodices, for the risk in leaving off a garment of that description of an evening would be less than that of leaving off one worn next the skin."

Although this letter was in opposition to the opinions I had expressed, I was pleased to see it,

for it raised a question of great importance, as far as the health of girls is concerned.

As long as fashion demands that Court and evening dresses should be made low in the neck, and with little or nothing in the way of sleeves, of course there will be many whose position in life is such that they are obliged to conform to this custom, however injurious it may be; and there are many others who will conform to the custom, not because they are obliged to do so, but because they like to copy their superiors in social rank.

The wearing of low-necked dresses is not a modern custom, nor is its condemnation of modern development. A French writer in the middle of the fifteenth century makes the following remark: "By detestable vanity, ladies of rank now cause their robes to be made so low in the breast, and so open on the shoulders, that we may see nearly the whole bosom, and much of their shoulders and necks, and much below, down their backs." But the ladies of rank were then, and are now, greatly in the minority, compared to the mass of women who are in sufficiently easy circumstances to be able to pay attention to their dress; and to all those who do not feel themselves bound by their social position to wear low dresses in the evening, I would say, wear your dresses as elegant and as ornamental as you can afford to, have them trimmed in the neck, if you like, to look as if they were cut low, but do not have your neck and arms bare—for this is the cause not only of colds and consequent debility, but when there is the slightest

taint of consumption it gives an opportunity for that terrible disease to develop itself. Many young girls at their first balls sow the seeds of disease which in a few short years will lay them in their graves.

In the case of girls who will be *obliged* when they "come out" to wear low-necked dresses, I should advise that while children they should have all the advantages of warm clothing such as I have described; but that in the summer preceding the season during which they are to make their *début* the long-sleeved and high-necked vest should be exchanged for one low in the neck, and with short sleeves. If this change is made in warm weather, it will not be felt; or if there is any feeling of chilliness, an extra outer garment can be put on at discretion.

It is well not to make the change suddenly, but gradually, by suitable arrangement in the warmth of outer garments. In the winter following, and afterwards, high flannel bodices may be worn as "Northerner" suggests. A healthy mode of dress during the childhood of these girls will have strengthened their constitutions, and I think they will not, as my correspondent fears, be more liable to take cold when they wear evening dress. The plan here indicated has answered admirably in the cases of some friends of mine, who have always been dressed on sanitary principles, but who, on State occasions, have to resign the high-necked and long-sleeved dresses and vests which they ordinarily wear, even for dinner and small evening parties.

These young ladies have not yet suffered from their enforced obedience to fashion.

To *débutantes* I would point out that the time of greatest danger for them is when, after having become heated with dancing, they pass into a conservatory or refreshment-room, or on to the staircase, which is cold and draughty. The cold air then comes directly in contact with their bare skin, and a chill which will lead to more or less serious results is the probable consequence. Seats beneath open windows should be avoided, and after dancing, a few minutes should be allowed, so that undue heat may have subsided, before passing into a cooler atmosphere.

A very good plan, but one which is not always practicable, is to have a small shawl or wrap to throw round the shoulders after dancing. Dancing is so delightful and healthy an amusement, that it is unjust for people to blame it as the cause of evils for which improper dress or imprudence in regard to draughts are really accountable. A motive which for some girls would be much more powerful than any consideration in regard to health is that, if they catch cold at one ball, the probability is they will not be able to go to the next, or that if they do go to it, they will labour under the disadvantages of a red nose, watery eyes, and the liability to interrupt the sweet nothings whispered by their partners with a violent sneeze.

But to return to my muttons, or rather my wool. While recommending it as the natural and most healthy substance out of which to make clothes, I

must warn my readers that most of the woollen materials now in the market are largely adulterated with cotton. This increases their weight, and perhaps improves their appearance, but it decreases the value of the stuff, not only because it is a cheaper material, but because it presents to the wearer the double disadvantage of increased weight and diminished warmth, as well as decreased facilities for transpiration. There are, however, tests by which it is easy to discover whether there is any admixture in the stuff, and two of these are so simple that they can be practised by any one, and should not be neglected when a purchase is to be made. Examination of the material with a microscope is the surest mode of detection, and a thirty-fold magnifier is sufficient for this purpose. The woollen fibre is seen beneath it as a cylindrical, nearly circular body, with a wavy outline; the cotton thread is flat and tape-like with angular folds, as if crumpled.

The second test is to separate the warp and woof, and hold them to a flame; the pure wool becomes a shapeless mass before it is consumed, leaves a shapeless ash, and becomes extinguished directly it is removed from the flame. Cotton or linen thread, however, burns after removal from the flame, and its form is plainly distinguishable in the ash. Threads made of a mixture of wool and cotton burn irregularly. Before purchasing so-called woollen materials, it is well to obtain patterns on which to experiment as here indicated.

The greatest disadvantage of woollen materials

is that some of them shrink considerably when washed. Woollen materials should be shrunk by soaking in hot water before use. Combinations and garments intended to fit close to the figure should be bought a size larger than is actually required, and when washed, the following plan should be adopted. The clothes should be soaked for half an hour in warm, but not hot, soap and water, about 108° Fahr. (30° Reaumur) is a sufficient heat. This will dissolve the fatty matter they have absorbed from the skin, and they should then be washed by passing through the hands, but not rubbed, which will spoil the texture of the wool. Any very dirty places should be specially soaped and brushed with a soft brush. If after this treatment the garments are not quite clean, soak them again in water with less soap than before, and pass them again through the hands; finally, rinse them quickly through clean cold water. After this washing they should be stretched with the hands, and hung up at full length to dry. When nearly dry they should be ironed, and before this they must not be placed near the fire. Woollen materials should not be mangled, as mangling spoils their texture. When precautions such as these are taken the size and shape of garments can hardly be injured by washing; but as laundresses are generally very careless in these matters, woollen clothes should be washed at home, and they should be washed frequently.

Mr. Bernard Roth, F.R.C.S., has remarked on this point:—"No doubt many of the objections

which medical authorities have raised to flannel being worn next to the skin have arisen from observations on the poor, who often will put on a flannel shirt or vest and keep it on till it almost falls to pieces. When I was house-surgeon to a London hospital I have more than once noticed an expression of surprise when a patient suffering from a skin affection was asked when his flannel shirt was last washed, the idea that a flannel shirt required washing never apparently having occurred to him. Such habits, combined with a total absence of any general ablution of the body, will no doubt engender that tendency to chill and to taking cold which is so unjustly put down to the wearing of flannel by some writers. Where a flannel is washed at reasonable intervals, say at least once a week, and if the whole body is bathed daily, only good can come from wearing it next the skin. I have never known any harm to result, but only good, after ordering such underclothing for patients, which I am constantly doing."

CHAPTER X.

THE USE AND ABUSE OF CORSETS.

I HAVE sufficiently urged the use of woollen combinations, and the question now arises, "What garments ought to be worn over these?" In answer, I would say,—As few as possible. I know I shall shock a good many of my readers when I say that I think that venerable and highly-respected article of female dress—the chemise—may advantageously be wholly dispensed with. Every one is supposed to have a chemise "to her back," but that this supposition is not wholly true was proved to me some time ago. When at the seaside last autumn, two girls, both friends of mine, and whom I introduced to each other, went one warm day with me to bathe. One said to the other, "I am afraid you will be awfully shocked when you see me undress." "Shocked! Why?" "Well, I hardly like to tell you; but the fact is, that I have so little on." "I don't wear much," said the other. "All I have is combination, stays, and one petticoat under my dress." Curiously enough, both these girls were dressed in precisely the same way,

in woollen combinations, stays (well shaped, and not tight), one petticoat, and a dress, which from its elegance gave no suspicion of the state of affairs underneath. As I had an opportunity of observing, these young ladies were dressed in perfectly sanitary style, although none but myself had any idea of the fact; and, in spite of it, they passed for two of the best-dressed girls at the fashionable watering-place where we were staying. I have since had several opportunities of observation, and I find that quite a number of the best-dressed women of my acquaintance have renounced the use of the chemise in favour of woven combinations. The majority, however, I believe, are not induced to do so by sanitary considerations, but simply because the chemise is a bulky article and makes them look stouter than is natural to them; whereas the combinations, being made in a stretchy material, fit somewhat closely and show the symmetry of the figure.

This is, to my mind, a very good reason why the chemise should be given up, but, from a health point of view, we can find a still better one. Chemises are generally made of linen or cotton, both of which materials, as I have already said, are unsuitable for clothing, because they are good conductors of heat, bad absorbers of moisture, and bad ventilators. It may be thought perhaps that there is no harm in wearing a chemise of linen or cotton if a woollen vest is worn beneath it; but this is a mistake, for the close web and vegetable fibre will prevent the escape of cutaneous evaporation,

and hinder that breathing of the skin to which I have referred in former chapters.

After violent exercise undergone by the wearer of a woollen vest and cotton or linen shirt or chemise, while the vest may only feel slightly damp, the other garment is found to be literally wringing wet. Woollen undervests also become sticky and greasy, because, the evaporation of the skin being hindered, it takes on the form of water, and causes the scales of the skin, which when dry drop off, to adhere to the clothes and to the body, thus clogging up the pores of the skin.

Another objection to chemises is the bad way in which they are generally cut. The armholes are cut round, and the sleeves are cut in one piece with the garment itself, or sewn in regardless of any shape. This prevents the arms from being raised unless the chemise can be dragged up with them, which it rarely can, as it is generally fixed down by the pressure of other clothes round the waist. Any garment which impairs the free movement of the arms is objectionable, as such movement is necessary to the proper development of the chest. If chemises are to be worn, they should be made of French cambric or of nainsook—materials which are thin and not very closely webbed, so that they ventilate better than linen or cotton; and they should be cut with armholes circular at the top and elliptic near the armpit, so that the arms may be raised without drawing up the chemise, or, better still, a gusset, such as our grandmothers used, may be inserted under the arm, which will serve the same

purpose. The armholes should be well sloped out over the shoulders.

The next article of dress to the chemise is the corset, and I approach this branch of my subject with great diffidence, for no part of ladies' dress has given rise to so much discussion as this, over which a war of words has raged fiercely for generations past.

Tight-lacing has been condemned for many centuries—in England by writers dating as far back as the reign of William Rufus, and in France the same moralist of the fifteenth century to whom I recently referred as condemning the low-necked dresses worn by ladies of rank in his time, goes on to say that these dresses were "so tight in the waist that they can scarcely respire in them, and often suffer much pain by it." Here, be it observed, however, that corsets, although the most convenient, are *not* the only means of tightening in the waist. Dresses worn without corsets may be laced so tightly that the unfortunate wearer can hardly breathe, and bands fastened firmly round the waist (Plate 5, line A, B) so as to serve the same purpose.

Perhaps that inner striving after a higher life, which is thought to be the especial prerogative of man, is the cause of the notable fact that universally human beings are dissatisfied with their own natural characteristics. They wish to make Nature hurry up to their ideal of what ought to be, and they therefore try to improve upon her. More than one nation compresses the skulls of its infants to

make them long, broad, or flat, as it chances to think best. Some tribes consider it vulgar to have white even teeth like those of a dog, so they file them down, colour them, and subject them to various other kinds of treatment, with a view to fitting them for their dignified position in the mouth of a man. Other nations, with much pain, tattoo themselves in elegant patterns, raise knobs of flesh on their faces, and stick large bones and shells through the lobes of their ears and the cartilages of their noses. It is not so very long since all Europe considered it impossible for children to grow straight without being swaddled. How could Nature be expected to do her work unaided?

From the earliest records of man, and to the present day, his efforts can be traced to improve upon the form which Nature has given him, until sometimes all semblance to the original design has been lost, and the "human form divine" has become the human form artificial. At the present time, among Europeans, this tendency is chiefly shown by both sexes in regard to the feet, of which more anon, and by women in regard to their waists. The custom of deforming the waist is, however, confined neither to Europe nor to modern times.

By various statues and bas-reliefs in the British Museum, I am led to believe that compression of the waist was a very ancient custom. Many of the figures, coming from widely different parts of the world and of very remote date, although nude, have waists which are perfectly round, instead of being elliptical, as is the natural waist, and which are so small in proportion to the other parts of the figure

that I cannot think they are due to the imperfect skill of the sculptor. In fact, I am rather inclined to think that they were possibly produced by tight bandages applied during the infancy of the individual, and removed when she attained full growth, just in the same way as the shape of the skull is permanently altered among other nations, by gradual crushing and moulding while the bones are yet pliable in childhood.

Hippocrates, about 400 B.C., speaks of a people he calls the Macrocephali, who, he says, directly a child is born, while its head is still tender, begin to fashion it with their hands, "and constrain it to assume a lengthened shape by applying bandages and other suitable contrivances, whereby the spherical form of the head is destroyed, and it is made to increase in length. Thus, at first, usage operated, so that this constitution was the result of force; but in the course of time it was formed naturally, so that usage had nothing to do with it." But it must not be thought that this is a long extinct custom; for, indeed, it is still existing among the Chinook Indians and the natives of Vancouver Island, although it is dying out under European influence.

According to Bancroft,[1] "Failure properly to mould the cranium of her offspring gives to the Chinook matron the reputation of a lazy, undutiful mother, and subjects the neglected children to the ridicule of their young companions, so despotic in

[1] "Native Races of the Pacific States of North America," 1875, vol. i. p. 238.

fashion." As among the ancients, the process is begun soon after the birth of the child, and continued for from eight to twelve months, until the head has permanently assumed the desired shape. Mr. Kane, who had considerable opportunities for observation, has remarked, "It might be supposed that the operation would be attended with great suffering, but I never heard the infants crying or moaning, although I have seen their eyes seemingly starting out of the sockets from the great pressure; but, on the contrary, when the thongs were loosened and the pads removed, I have noticed them cry until they were replaced."

I have referred at length to this practice of deforming the head by pressure, because it throws great light on that other and equally barbaric practice of deforming the waist by tight bandages or stays. (See Plates 2 and 4.)

In reply to a remark that either of these practices is injurious, a similar answer would be made either by the Chinook Indian or the European *modiste*, and that answer would be, "It is nonsense to say that it can be injurious, when it is not even painful."

The reason of this immunity from pain is to be found in the marvellous adaptability of living things to their surroundings. In our sensations Nature has provided us with a code of danger signals, of which *pain* is the index. Thus, a sound loud enough to be painful is a warning that, if we continue to hear it, injury will result to the delicate auditory apparatus; a light strong enough to be dazzling

bids us, if we value our eyes, to turn them away; if we put our hand against a sharp point it is a signal not to go on pressing in that direction; an unpleasant taste often indicates a poisonous matter; and a bad smell teaches that we are breathing impure air.

The case is better understood by analogy if we refer to the hand of a workman. If rough work is done the soft and delicate hand is pained; if, however, the work is persevered in, the hand ceases to be so sensitive, the skin grows thick and horny, so that rough surfaces, and even hot coals, can be handled with impunity; but at the same time the delicate sense of touch has become grievously impaired.

Owing to the wonderful adaptability of Nature, if the warning given by a sensation is persistently neglected, after a time it ceases to be given. The pain has become deadened, but injury results none the less. For example, a bell-ringer going for the first time to his work finds the clang and clash of his bells almost insupportable; after a time, however, he grows accustomed to it, and at last hardly feels it at all. He has gained immunity from pain, but he has gained it at the expense of injury to the nerves of hearing—he has become deaf.

Besides the senses just now referred to, there are others of equal importance. Such, for instance, is the sense of hunger. If sensations of hunger are neglected, appetite is lost; on the other hand, if the stomach's warning of "I have had enough" is unheeded, the nerves of that organ after a time get wearied, and no longer send their important mes-

sage to the brain, so that a habit of over-eating is acquired.

The most important of all rules for the preservation of personal health is that the *senses must not be vitiated by neglect of their warnings.*

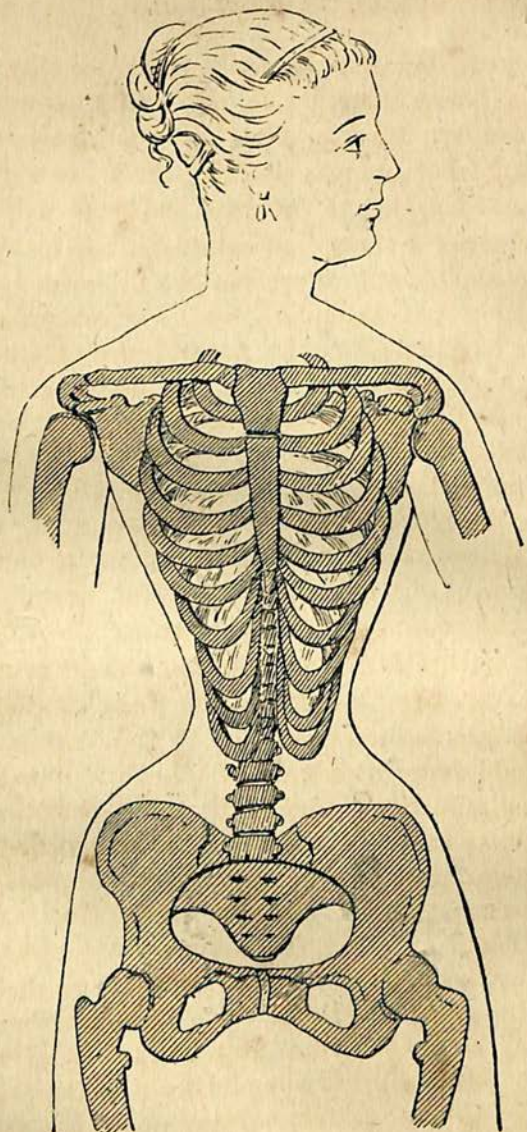
But the chief sensations which concern the subject of dress are those of heat and cold. The sensations of heat are, as a rule, fairly attended to in our climate, which is rarely so warm as to need any very special care, and love of appearance is also a safeguard in this respect; for we do not like to look hot and perspiring, and so take care to keep as cool as possible in warm weather. Sensations of cold, however, are habitually neglected, and I have shown in Chapter IV. how much harm is done by it, in spite of the fact that, owing to the blunting of sensation by habit above alluded to, the cold may not be felt.[2]

In passing I would point out as an example of that wonderful adaptability of animal nature to its surroundings, the way in which it has been outraged by fashionable Europe for centuries past in the matter of dress. By fashionable Europe I allude primarily to France and England.

That people should have at all survived the sufferings and injuries inflicted upon them by the cruel and fickle goddess Fashion for several centuries past is an astounding proof of the hardiness of the human race, and its power of adapting itself to adverse circumstances.

Nature will adapt herself to objectionable cir-

[2] See p. 56.



B. R. del.

Plate 2.—Female figure showing skeleton deformed by tight-lacing.

To face p. 149.

cumstances; but that is not a guarantee that no harm is being done. Life will continue under conditions so adverse that its continuance is surprising; but it may be laid down as a rule that a sudden change in vital conditions will be fatal, whereas a change as complete, but brought about gradually, will affect the health insidiously, but will not put an end to life. For example, if we were to take a girl the natural size of whose waist was twenty-four inches, put on her a small pair of stays, and draw those stays in till the waist measured sixteen inches only, that girl would faint almost immediately, and, unless the stays were opened, would probably die from failure of the heart's action, owing to mechanical pressure on the heart—one of the evils brought about by the external compression. But if we were to take a girl of the same age and height, whose shoulders and hips measured the same, but who from childhood had been gradually accustomed to tight lacing, we should find that, with a waist of only sixteen inches, the vital functions were still being performed, although, as might be expected, health was feeble, for not one organ of her body on which the pressure had been exerted would be in its right place. (See Plates 2 and 4.) The deformity caused by tight stays is unfortunately generally effected so gradually during the years of growth that the sufferer is unconscious of any harm. Moreover, just as the Chinook infant will cry when its head-bandages are removed, so the woman whose body has been crushed out of all semblance to its natural form by

the gradual application of pressure by stays, each successive pair of which is tighter than the last, will exclaim if her corsets are taken away, "I could not exist without their support. My back aches without them, and I feel as if I were falling to pieces."

I hope that my readers will not, by these remarks, be led to think that I want to subvert the very foundations of society. I have no desire to have the majority of my own sex rising up in outcry against me. All that I wish to do is to place before them certain simple facts in Nature and in physiology which must appeal to their reason more strongly than mere denunciation could possibly do, and as at present I am writing as a woman for women, the remarks I may make here should not be stigmatized as immodest.

There is a very popular saying, that "Familiarity breeds contempt;" this is, however, most untrue as regards the human body, for it is precisely those who know the least about it who despise and ill-treat it the most. The more we learn about the marvellous mechanism which performs our vital functions, the more wonderful and beautiful does it appear—beautiful, I say, for true beauty is the perfect adaptation of the means to the end, and the organs of the body are by nature perfectly adapted to the production of healthy life. "Know thyself" is a precept that has not yet been hearkened to as it should be; but if only it were obeyed our constitutions would not be injured and Nature outraged in the persons of her children, as now happens every day and every moment. What is there

inherently repulsive in ourselves that we should shrink from knowing what our bodies are, what organs they contain, and what are the functions of these organs? "We are fearfully and wonderfully made," and the more we know of ourselves, the more firmly convinced of this fact do we become.

Knowing nothing of their own bodily constitution, the "untutored savage" and the equally ignorant votary of fashion in civilized life, do their best to improve upon perfection, they "paint the lily," and so impair the noble work of Nature. The savage we can pity; he is at a lower stage of evolution than ourselves, and he is unable to appreciate the truths which centuries of development and education have made patent to us. We then smile half in contempt and half in pity at his customs, which we call "barbarous;" but when we see around us customs equally injurious, equally outrageous against nature, we do not consider that they in any way derogate from our lofty position as the intellectual salt of the earth. We merely say that they are the fashion, and, in point of fact, we grow so accustomed to the forms which Fashion has inflicted upon us, that when we see what is natural, it appears quite strange. Deformity has through long custom become to us beauty. If those ladies who deform their own and their children's waists by squeezing, only knew what was inside them, I venture to believe the very thought of tight-lacing would appear horrible and unbearable to them.

For instance the fashionable shape of the waist

is entirely different from that given by Nature. (See Plates 1, 2, 3, and 4.) The natural waist of a well-formed woman (Plates 1 and 3) of average height would measure from twenty-seven to twenty-nine inches, and in form it would be elliptical from side to side instead of round, as we generally see waists. In fact there is naturally but little difference between the proportionate size of the male and female waist. But by the baneful practice of tight-lacing, the waist is seldom allowed to be even twenty-five inches; women whose waists measure twenty-four and even twenty-one exclaim with horror if accused of tight-lacing, and these are the majority; but many reduce their waists to much under twenty inches, and at a certain fashionable stay-maker's I saw corsets measuring only fourteen inches, which the maker assured me she supplied to many customers. (See Plates 2 and 4.)

Unfortunately, people rarely think of what is inside them, and indeed they consider it rather wrong to do so. A good illustration of this occurred to me a night or two ago. I was crossing a ball-room on the arm of an old friend, when a girl passed me whose waist must have measured about sixteen inches, while from the development of her liberally exposed shoulders, it was evident that its natural size would have been twenty-five inches or twenty-six inches. Almost involuntarily I exclaimed, below my breath, "What can have become of her liver?" He caught this observation, which was not intended to be heard, and exclaimed in a shocked tone, "How can you think of such dreadful

things! You take all the poetry out of it." For my own part I cannot see what poetry there can be in a girl's waist reduced to ten inches less than its proper size, any more than there is in the mangled skull of a Chinook Indian. When I see a figure like that described, I invariably think of what it would look like on the dissecting-table, and probably the same unpleasant idea would occur to any one who is familiar with the natural proportions of the human frame.

I do not mean to decry the beauty of a small waist, for those whose organs are small have naturally small, fairylike figures; but I contend most strongly, that to reduce the waist of a largely-built woman to the dimensions of that of a slight girl, is to produce a ridiculous deformity. I purposely call it ridiculous, for philosophically speaking, those things which we call ridiculous, which arouse our sense of humour, will be found on inquiry to be ill-adapted to the end they are intended to subserve, to the extent that they are out of harmony with their surroundings. We speak of absurd or ludicrous efforts, which are just those that are purposeless or ineffectual. Caricatures are drawn with big heads and small bodies. It is in this way that a squeezed-in waist is ridiculous, for it is evidently out of harmony with its surroundings, and it would jar fearfully against our sense of proportion were it not that that sense has become dulled by habit. (Compare Plates 1 and 2.)

At the risk of its becoming repulsive to the dainty and sentimental among my readers, I will

venture to give a short description of those parts of the body which are affected by the wearing of tight corsets; for I firmly believe that if women were more familiar with the construction of their own bodies, they would shrink with horror from the sins that they are now ignorantly committing against their own health and happiness. I would fain diminish the number of those cases where, if a coroner's jury were empanelled on the fair victims, the only true verdict possible would be "Died of tight stays."

When we know the number and size of the organs contained in the thorax and abdomen, one of the thoughts that naturally arises is, how marvellously all these organs are arranged, so that all can lie in so small a space. There is no waste room in the body, and every inch of space is fully occupied. Hence, if that space is diminished by pressure from the outside, it is evident that overcrowding, with all its attendant evils, must take place.

The thorax, or cavity of the chest, is divided from the abdomen by a thick muscular partition called the diaphragm. (See Plates 3 and 4.) The chest cavity contains the lungs, which extend from beneath the collar-bones low down on each side of the body to the bottom of the true ribs; the heart, which is the size of the owner's clenched fist; the large vessels connected with it, which pass down through the diaphragm to the lower part of the body, and the œsophagus or gullet, a muscular tube also passing through the diaphragm to the stomach,

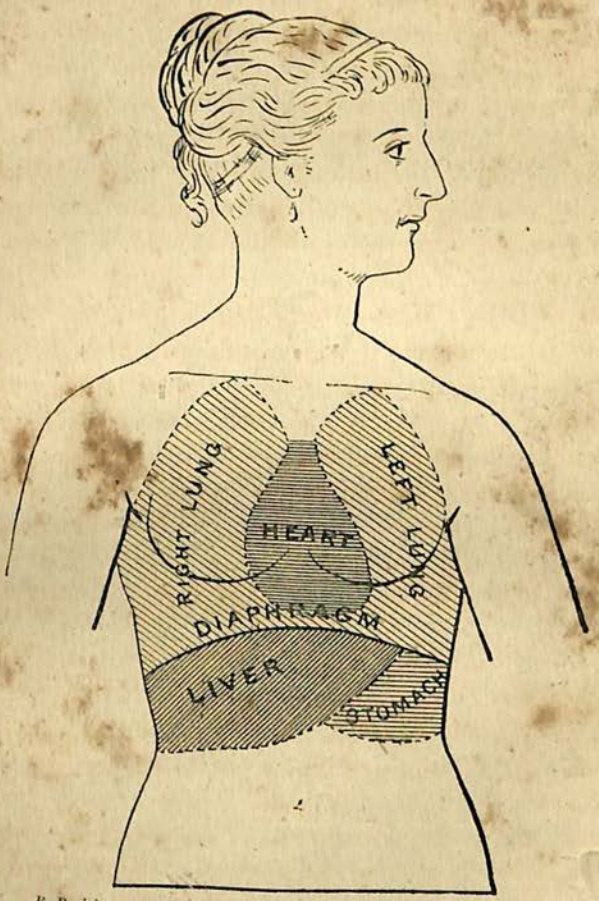


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Plate 3.—Diagram showing normal position of the chief vital organs.

To face p. 154.

which is situated just below in the abdomen. The abdomen contains the stomach, a large membranous bag capable of holding about three pints, which is situated on the left side of the body and crosses it towards the right; the liver, which weighs from fifty to sixty ounces, and lies on the right side of the body, with its upper surface touching the diaphragm, while its lower surface touches the intestines and right kidney; the spleen; the pancreas, or sweetbread; the continuation of the great blood-vessels; the two kidneys; the bladder, &c.; and the intestines or bowels—a muscular tube of varying diameter, disposed in close coils, the bulk of which may be imagined from the fact that, if they were drawn out, the total length of the tube would be about six times that of the body from which it was taken.[3]

Most of these organs in the natural state can undergo a considerable amount of movement: the lungs expand widely, the cavity of the chest enlarging at the same time in all directions by the bulging out of the ribs and pressing down of the diaphragm. This communicates a movement to the abdominal organs, as may easily be felt if the hand is placed on the abdomen while two or three deep breaths are taken. The stomach during digestion expands and churns the food about; and considerable movement takes place among the

[3] Plate 3 shows the natural position of some of these organs; the intestines, &c., are not shown, but should occupy the lower part of the figure.

bowels, the coils of which pass freely over one another.

After even this brief sketch of our internal organism we are enabled better to appreciate the injury done by tight-lacing.

To begin from the outside, tight stays hinder the action of the skin of the parts they press upon by impeding the circulation ; they weaken the muscles of these parts, especially those of the back, by preventing the amount of movement necessary to their healthy development. They act very much like splints, and we all know how weak the muscles feel after these have been removed. This accounts for the fact that a woman who has been accustomed to lace tightly, feels as if she "must fall to pieces" if she leaves off her stays. Next, they gradually press in the ribs, which in time become permanently deformed. (See Plate 2.) The ribs crush the lower part of the lungs, which are thus prevented from performing their due amount of work. Owing to their pressure the lower part of the chest cannot expand outwards, and it is also hindered from expanding downwards by the impeded action of the diaphragm. Thus, although an increase of work is thrown on the upper part of the lungs, breathing cannot be naturally performed, and from this many serious diseases may arise. A tendency to consumption is hereby encouraged, and, even without this tendency, blood-spitting may be caused by the pressure. But, besides interfering with the action of the lungs, this pressure, in limiting the space occupied by the other organs, hinders their natural

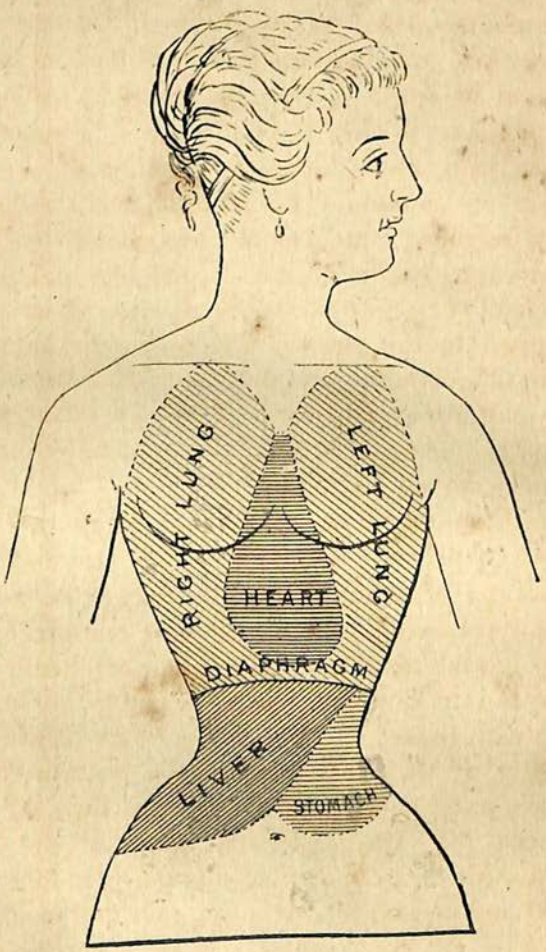

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Plate 4.—Diagram showing displacement of the chief vital organs caused by tight-lacing.

To face p. 157.

and healthy motions, the heart and stomach are deranged, the action of the liver hampered, the movements of the bowels restricted. Hence arise indigestion, constipation, headaches, weariness, depression of spirits, palpitation, and a feeling of oppression at the heart, pain in the side, eruptions on the skin, which either feels chilly all over its surface or sometimes burns, and, what will probably seem of much more importance to those whom vanity has induced to lace tightly, pallor and thickness of complexion, with a yellowish or greyish tinge to the cheeks, and owing to impaired circulation, swelling and redness of the hands and feet, and, worst of all to the would-be beauty, *redness of the nose.* The spine also not unfrequently becomes curved laterally.

Furthermore, all the abdominal organs are displaced by pressure round the waist. If you take a bladder full of air and squeeze it firmly in the middle, the air, following the line of least resistance, will bulge out the bladder on either side of your fingers. Now, it is very much the same with the human body with regard to stays, the pressure of which is greatest at the waist, least at the bottom of the abdomen. The abdominal organs follow the line of least resistance, and are, therefore, displaced downwards.[4] This displacement is productive of many and serious ills, constant pain and weariness

[4] Plate 4 when compared with Plate 3 shows the displacement of the chief vital organs. The abdominal organs which are not shown in the plates are displaced downwards in a similar manner.

being some of the most common, and it is a frequent cause of sorrow and death to young married ladies.

Many ladies who are hoping to become mothers, either through ignorance and vanity, or through feelings of modesty which lead them to try to conceal their condition, so press in their bodies by tight, stiff stays, that their children cannot grow properly, and if they live to term are born weak, deformed, and crippled. But the very fact of tight-lacing will frequently prevent the possibility of motherhood, and it is a prevalent cause of miscarriage, falling of the womb, piles, and varicose veins, with other painful affections far too numerous to mention.

Only the physician can know the full amount of death, suffering, and mental anguish brought about by the state of affairs which I have attempted to describe, although incompletely, knowing as I do the popular horror of plain speaking, yet all this mischief is caused by a piece of vanity so apparently trifling as the desire to have a smaller waist than Nature has intended.

Can the pleasure of boasting a tiny waist be weighed in the balance of the mental and physical agony at the cost of which it is obtained? But ladies are too apt to avoid weighing the value of their pleasures in this manner. They follow the fashion, whatever it may be, quite blindly, and without endeavouring to adapt it to their own requirements, under a sort of tacit belief that "whatever is, is right;" and, if their conduct is ever

called into question by intelligent but presuming male relations, arguments are sure to be found to defend it, and, whether justly or unjustly, the rash adviser is generally ignominiously defeated. Thus, a woman whose muscles, as I just now pointed out, have been weakened by tight stays, will declare with some show of reason that she could not sit or stand upright without their support.

No lady under any circumstances will own to lacing tightly, and in ninety-nine cases out of a hundred she will challenge her accuser to what is apparently a crucial experiment by exclaiming, "I wear tight stays! why, just see, you can put your hand up underneath them." And in point of fact this frequently can be done: but it is really no test at all, for by drawing in the abdominal muscles which act upon the chest end of the ribs, and at the same time raising the diaphragm, and leaning forward, she diminishes the girth of her body, although putting extra pressure on the internal organs.

These arguments, then, are mere sophistry, and a more searching test is required than that above; as such, I would suggest the plan practised by Mr. Bernard Roth, F.R.C.S., when he suspects his patients of tight-lacing. The stays should be opened, all bands of the clothing loosened, and the girl or woman accused of this crime against health should be made to draw breath deeply and slowly several times in succession, holding her arms up above her head with the shoulders well thrown back. Then while standing erect she should try

to fasten her dress without refastening her other garments. This she will be unable to do if the stays over which it was made were too tight; for the chest, having been for once properly expanded, will not readily return to its former cramped state.

If women who have worn stays all their lives wisely elect to give them up they must do so gradually, for they would suffer from the sudden change, as I have already indicated. At first thinner busks should be substituted for those in use, then after a week or two some of the bones should be removed, and so on until all the support in the stays is taken away. After this the muscles will have adapted themselves to the gradual change and have come to rely upon themselves for support, and then the stays may be exchanged for the bodice I shall describe in the next chapter. While condemning tight-lacing and giving the reasons for this condemnation, I have been careful not in any way to condemn the use of the corset as such; as I have observed, women may lace tightly without wearing stays, and, on the other hand, they may wear stays without lacing tightly.

The abuse of the corset is at present, unfortunately, rampant in England, and every day in society we see sights shocking to the eye of the artist and of the sanitarian. It is no rare thing to meet ladies so tightly laced that they positively cannot lean back in a chair or on a sofa, for if they did they would suffocate. I know many a girl who can hardly dance because the agony which exercise causes her in the cramped state of her

body is too great, and I have often heard young men remark, by way of a joke, "I'm almost afraid to dance with Lady A., or Miss B.; I am afraid she'll break in halves, and I should not like to be responsible for her death!"

Although French ladies wear as tight corsets as their English sisters in folly, they do not suffer so much from their effects, and this for a good reason. English ladies pride themselves on being "always fit to be seen," and they therefore wear their corsets all day long, and remove them only when they go to bed. French women, on the other hand, have certain times at which they are "on view;" when they ride in the Bois or visit, and for evening wear they lace as tightly as the English; but when they are in their own houses and not going to receive, stays are thrown aside, and their tortured bodies are allowed to expand to their natural proportions. Hence with them the evil is confined to a few hours in the twenty-four, whereas with the English it extends to fourteen or more, and the harm done is correspondingly greater.

There is a well-known story of an English lady who, condoling with a Turkish matron on the seclusion of the harem, was answered by the remark that the harem was very good and proper, but it seemed dreadful "that English husbands should lock their wives up in iron cages." The Mahomedan was wrong in attributing such cruelty to English husbands; but she was right about the existence of the iron cages. Opinion about the *raison-d'être* of stays has altered in the East since

the time of that story, as will be seen from the following conversation, which was overheard at a wedding in Armenia:—"Doudou, do you notice how stiff and stately Mariamme Hanoum sits in her new polka? Her husband, Baron (Mr.) Carabet, who has just returned from Constantinople, has brought her a machine made of whalebone and steel, in which the Franks cage their wives, *in order to fill up what is missing, and tone down what is superfluous.*" The italics are my own, and convey a meaning which appealed to the intellect of Doudou, who replied, glancing at her own very voluminous person. "Wonderful! I wonder if the like is to be found in the *Chershi* (bazaar); many articles of dress have been lately brought from Europe by one of the shopkeepers."[5] It is to be hoped, for her own sake, that they were not, for although Mahomedan ladies are by no means free from sanitary crimes, they have hitherto not been guilty of that of tight-lacing. But to return to our own country.

Those persons, for the most part men, who have learnt to appreciate the evils of tight-lacing, have almost invariably been so eager to abolish those evils that they have fallen into an error of judgment, and have sought to do so by entirely abolishing the use of the corset. This has been one, if not the chief, reason of the ill-success with which their laudable efforts have met, for, appealing as they have done to grown-up women, they have appealed

[5] "The People of Turkey," by a Consul's Daughter, vol. ii. p. 69.

to ears rendered deaf by long custom. As I have already hinted, those who have almost from infancy worn stays cannot suddenly renounce their use without serious discomfort. My friend, Professor Sayce, speaking of spelling reform, once observed, "All new things are sure to be objected to by those who have to unlearn the old;" and this is true not only in mental, but also in physical life. Old customs cannot be ousted with impunity. In matters affecting the body, as in those affecting the mind, reform, to be effectual, must be gradual.

More than fifty years ago a Dr. Reidel, urging the total abolition of the corset, suggested that all female delinquents in the houses of correction and in prisons, and women under sentence of death, should be forced to wear stays as a part of their punishment, thinking thus to disgust ladies with an article of dress that formed part of a felon's attire. The suggestion was never put into execution, and if it had been it is doubtful whether any good would have accrued from it, for to many ladies the wearing of corsets is not only not injurious, but absolutely beneficial; but in these cases the corsets must be well made to fit the natural shape of the figure, *and must not be tightly laced.*

I contend that corsets should *not*, as most dress-reformers ardently desire, "be improved off the face of the earth;" but they ought to be "improved," and their use ought to be limited to those who require them, of whom I shall speak hereafter.

It is desirable, however, to decrease the number of those who require the support of stays, and

this can only be done by proper attention to the children of to-day, who will be the women of the next generation.

Nearly a century ago the Emperor Joseph II., well known for his philanthropy, had evidently convinced himself of the truth of this principle, and his effort to suppress tight-lacing was the most practical and best deserving of success that has ever been made. He repeatedly prohibited the wearing of stays in all convents, orphan asylums, schools, and other public institutions for the education of the young, and he obliged all schoolmasters to refuse to take as pupils any girls who wore corsets. To do this is to strike at the root of the evil, which is precisely what all reformers ought to endeavour to do.

After having read the foregoing, no one will be surprised when I say that I would entirely do away with the use of stays or corsets of any kind for girls until they have attained their full growth, unless in case of disease or malformation, when a surgeon's advice should be followed in this respect. And here I would caution every mother on no account to go to an instrument maker, have surgical stays made for her girl, and allow her to wear them without the advice of a competent surgeon; for very frequently under these circumstances instruments will be worn for months, and even years, for which there is not only no necessity, but which are actually increasing the evil they are supposed to cure. In most cases incipient deformity can be remedied by well-advised postures, and active and

passive movements, and the surgical world is beginning to acknowledge that the value of instruments as a curative measure for such cases has been greatly over-estimated.

After the attainment of full growth, girls may wear the ordinary dress in fashion with very much less risk of injury than they could have done in earlier years; and the reason of this is obvious, for their constitutions have become settled, the bony structure of their frames has grown firm and hard, and their organs have attained their full and natural development.

The age for the completion of growth in women cannot be definitely fixed under twenty-three years, but by the time when girls "come out," at about eighteen, they are as a rule sufficiently well developed to be able to conform to the requirements of fashion, and the wearing of corsets will do them little if any harm, provided they are well made and not tightly laced. Ill-made stays have been known to produce cancer of the breast by pressure on and friction against those delicate organs, and they not unfrequently hinder the development of the breasts to such an extent that they render it impossible for many mothers to perform their natural duties to the young infants who are dependent on them for the only nourishment which is suitable and wholesome for them.

The ordinary stays worn by women when first they go about again after childbirth but too often increase the tendency to displacement which they are intended to avert. They press those organs

downwards which really at this time require to be supported. The proper support can best be given by an abdominal belt made for the purpose, which may be worn with or without stays. See Fig. 18, p. 215, which belt may be made for use during pregnancy or after confinement.

Grown-up girls, unless they are very thin, usually require some support for their bosoms; this may be given by some such article of dress as the Grecian and Roman ladies wore of old, a sort of band shaped to preserve the spherical form of the breast, and fastening at the back between the shoulder-blades. If, however, corsets are worn, they should be moulded to the natural figure, and the less stiff they are the better.

I have already laid sufficient stress upon the fact that corsets are not needed by everybody, and should only be worn when they are needed. For slight girls and women they are quite unnecessary, but when there is an inclination to *embonpoint* they are, if not necessary, desirable so far as appearance is concerned, for in such cases the figure is apt to obtrude itself through the dress, and attract attention, which is unpleasant to a delicately-minded girl. A stout girl without stays looks very much like a shapeless and quivering mass of fat, and is by no means a charming spectacle; but if attention is paid to secure corsets properly made on sanitary principles, if these are changed as the figure changes, and are never laced too tightly, they will do no harm, and may safely be recommended. If on removing her stays at night the

wearer finds her skin has been marked by them, she may know that they have been laced too tightly. The skin will then look red at the points of greatest pressure, and will irritate, these phenomena being caused by the reflux of the blood to those parts through which its progress was previously hindered. The custom of buying ready-made stays very much at random, and because they look nice, is most strongly to be condemned as in them the figure is made to fit the corset, not the corset to fit the body, as it invariably should. The idea that corsets can be bought ready made to fit properly is quite erroneous, for no two figures are exactly alike, and a garment moulded to the shape of one person can never absolutely fit another.

Good staymakers should be employed, preferably those who possess a knowledge of anatomy, a knowledge which is now, unfortunately, as rare as it should be common among this class. The "Girton stays," sold by the Rational Dress Society, are to be recommended for ladies who are not inclined to corpulence, but women who are fat, or have a tendency to become so, need to wear stiffer and tighter stays than other people, as a little pressure will be rather beneficial to them than otherwise, by checking the increase of fat. Hence no hard-and-fast rule can be made as to stays to be worn by everybody, for they should be suited to the peculiarities of each individual. Some need none at all, some only very light stays, and others those of a more substantial kind. But, generally

speaking, stays should be constructed of yielding material, with as few bones as possible, and the slightest, narrowest steel busks that can be obtained; and they should have narrow strips of elastic webbing let in throughout their whole length on each side. They should be well shaped over the abdomen, and should be made sufficiently long in front to support it. In putting them on they should be fastened from below upwards, so that the soft parts may be raised instead of being pushed down, as is the case with the ordinary stay, which is usually flat and shapeless in these parts, and to fasten which, people almost always begin at the top.

Fig. 8.

Fig. 8 shows stays constructed on these principles by Mr. Bourne, under my instructions.[6] The white line from the arm-pit to the hip shows where the elastic is inserted, and the lower part of the stay, which fastens with a buckle, is shaped so as to support the abdomen.

For the reasons previously stated, woollen materials should be employed in making stays, and they should not be stiffened with starch or any

[6] See p. 67.

substance which will render them incapable of ventilation and impervious to perspiration. The "Girton stays" are made of flannel, and there are many other kinds of woollen material which are suitable for the purpose. The small ventilating power of ordinary stays is another serious charge to add to those I have already made against them.

Before quitting the subject of stays, I may remark that the ordinary mode of lacing them is very inconvenient and clumsy. A far superior method was shown, and gained a medal at the Health Exhibition; and the inventor of it, Mr. Frederick H. Smith, of 52, Queen Victoria Street, has kindly lent me the subjoined illustrations. The advantage of this method is that the stays can be immediately contracted or expanded with the greatest ease. The stay cords run on tiny pulleys, so that the laces adjust themselves to every movement of the body. Moreover, as the pulleys are perfectly flush with the stay, the laces are not visible through the dress, and do not fret the skin as is sometimes the case with ordinary laces. Figs. 9 and 10 show the frame of the pulley, while Fig. 11 shows the pulley itself, and Fig. 12 the needle with which the lace is threaded round it.

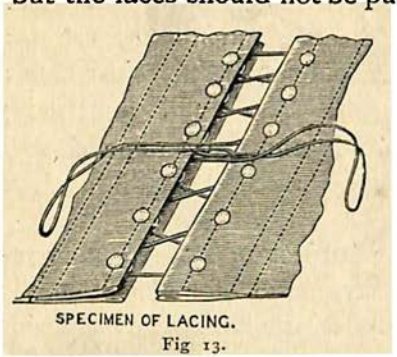
PIN
Fig. 9.

WASHER
Fig. 10.

PULLEY
Fig. 11.

LACING NEEDLE
Fig. 12.

The complete plan of lacing is shown in Fig. 13; but the laces should not be pulled out in the middle to be tied round the waist, as in the illustration, but should be drawn down to the bottom of the stays, and fastened there at the back. This is very easy to do, and it saves the waist from the pressure of the cords. Indeed, whether the old or the new system of lacing is employed, this remark holds good and is of importance.



SPECIMEN OF LACING.
Fig 13.

When stays are worn, the petticoats should be fastened on to buttons attached to them, and the underclothing can then be very simply and easily arranged as follows: Woollen combinations worn next the skin, stays to which the petticoat, or petticoats, are to be attached, and if the weather is cold, a woollen bodice may be added, but this is rarely required.

CHAPTER XI.

A NEW SYSTEM OF DRESS FOR WOMEN.

WHEN stays are not worn, it becomes a matter of some difficulty how to fasten the clothes so that their weight shall not fall unduly on any particular part of the body, and so that they shall not press tightly on any part; the figures of most young girls are so slight that their garments have a strong tendency to slip down over the narrow hips. To counteract this tendency it is necessary either that union garments should be worn, or that all separate skirts and drawers should be fastened to a bodice.[1] Only recently a correspondent of the *Queen* re-

[1] The plan proposed by many so-called dress reformers of supporting women's clothes by braces is most objectionable. In this case, as when the clothes are supported entirely from the shoulders, the weight of the clothing drags the shoulders forward, and inclines to curvature of the spine. Moreover, the friction of the braces would hinder the development of the breasts in young girls, and chafe those delicate organs in adults. Men would stoop less, and have better-developed chests if they managed without braces; why then should women be urged to adopt these injurious articles of dress?

commended a bodice for this purpose, but, according to her description of it, the bodice was to be cut only to reach the waist. (See Plate 5, line A, B.) This is a mistake, for in this case the weight of the clothes would hang entirely from the waist, and would press upon the soft parts of the pelvis, thus causing perhaps serious mischief. The bodice should be cut well down over the hips, and the buttons placed round the bones of the hips so that the weight of the clothes may be supported by these bones as in the accompanying engraving.

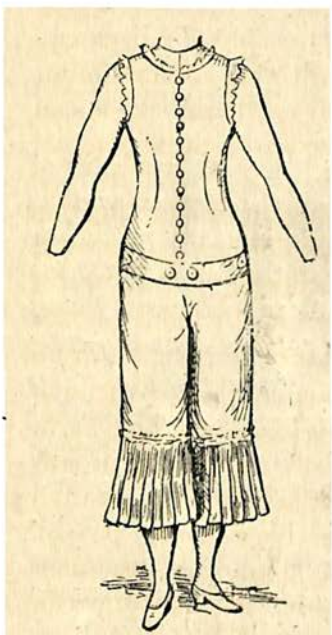


Fig. 14.

A high-necked and long-sleeved woollen combination vest and drawers should be worn next the skin. Over this should be a closely-fitting flannel bodice, on to which the suspenders of the stockings should be buttoned, and to which the drawers can be fastened if made separate from the vest. On to the bodice also is fastened what is called the divided skirt—loose trousers made of the material of the dress, the bottom of each leg being finished with a kilting. The above illustration, which the National Health Society has kindly lent me, shows

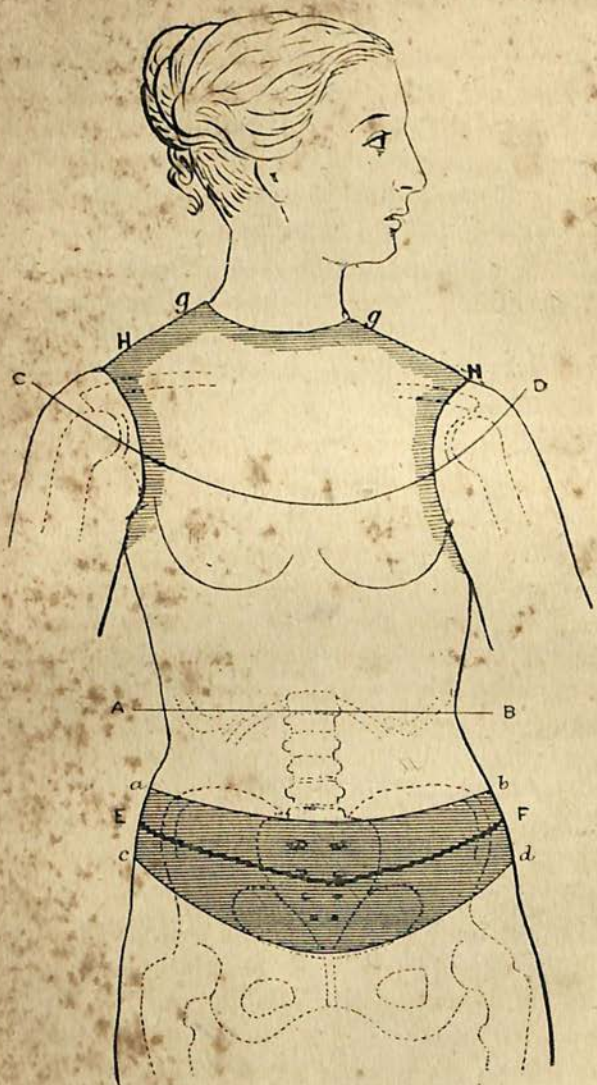
the sleeves and neck of the vest, the bodice, and the divided skirt.

These form the whole of the under-clothing, though in very cold weather an extra pair of woollen drawers may be worn under the divided skirt. The advantages of this system of dress are manifold. It clothes every part of the body evenly and warmly, permits perfect freedom of movement, gives the maximum of warmth with the minimum of weight, and, as none of the garments fasten round the waist, injurious pressure on the abdominal and pelvic organs is avoided.

Besides the advantage to health in adopting this plan, as the thickness of the clothing is removed from the waist its natural outline is shown; and if the figure is beautiful, its light is not hidden under a bushel, as in the former case. It is said that all the weight of the clothes should fall upon the arch of the shoulder and the pelvic bones; but, as in the young these bones are not sufficiently prominent to serve as supports, the weight has to fall chiefly upon the shoulder. Now many people, knowing the evil of tight clothing, have their children's things made so loose, that the hand can be passed up between them and the body; the weight thus falls entirely on the shoulder, and the bones, not having attained their full growth and firmness, are liable under this strain to become deformed. The weight of the dress, owing to trimming, &c., is not equal on all sides; hence, if it drags towards the front the neck is poked forward, while the shoulders grow round and

protruding; if heavier on one side than the other, one shoulder is constantly hitched up, and grows higher than the other, and the head is twisted to one side to retain the centre of gravity. The spine may become curved and the pelvis deformed owing to the way the body is twisted. The chest is also compressed by the weight hanging over it, and breathing becomes laboured—an accident which brings with it a whole train of evils, of which the chief is general debility, brought about by insufficient aëration of the blood. The weight of the clothes is, moreover, rarely supported on the shoulder arch, but on the upper part of the arm itself, which it pinions to the side. This is caused by the bad way in which clothes are generally cut. If—as, for example, in chemises—the garment is low in the neck, the band or sleeve, which is supposed to rest upon the shoulder, almost invariably slips down over the arm, causing a painful dragging at the shoulder (see Plate 5, line C, D), and preventing the possibility of raising the arms over the head. High-necked garments also are frequently cut too long on the shoulder—a fault which brings about much the same unpleasant result; and armholes are generally made too small to allow those free movements of the arms which are necessary to their healthy development and to the development of the lungs.

The great desideratum is, that clothes should *fit*, in the proper sense of the word. They should be neither too tight nor too loose. As I said in a former chapter, clothes in their action are supple-



B. R. del.

Plate 5.—Diagram showing good and bad positions for the support of the weight of clothes.

To face p. 174.

mentary to the action of the skin, and they should also fit as nearly like the skin as possible. The skin, it must be remembered, is elastic, and gives with every movement of the body, hence the material of clothing should also be, as far as possible, elastic. In being elastic, the woven material out of which vests and drawers are now made possesses a great advantage over ordinary flannel; while they stretch to every movement, they fit to the figure sufficiently well to prevent their weighing particularly on any one portion of the body, their weight is distributed equally, like their warmth, all over the body. In the system of under-clothing which I advocate, and which is illustrated by the above figure, combinations should be worn next to the skin; or, if the objection to these, which I spoke of on p. 131, is raised, a vest of woven wool, coming well down over the hips, may be worn next the skin, and drawers, either of the same material or of flannel, can be buttoned on to the bodice. The thickness of the material of which this and all the other garments are made can, of course, be varied to suit the temperature of the air. I advisedly do not say "to suit the season of the year," for it is observable that the weather and corresponding temperature is, as a rule, "very unseasonable:" the merry month of May is a snare and a delusion, devoted to rheumatism and colds in the head.

The bodice itself should be made of flannel, for if it were constructed of a stretchy material, it would give too much to properly support the

weight of the garments attached to it. It should be high in the neck, but need not have long sleeves; it should be cut very short on the shoulders (see Plate 5, line G, H), and well sloped out under the arms, so as not to impede their movements. Over each hip a button should be sewn to support the suspenders of the stockings (Plate 5, *c*, *d*). Here be it observed that woollen stockings should always be worn, and that suspenders ought invariably to be substituted for the ordinary elastic garter, which tends to interfere with the circulation of the lower part of the leg, producing cold feet, and has even been known to cause varicose veins by checking the return of the blood towards the heart. Above the buttons for the suspenders should be four, one towards the front of each hip and one towards the back, for the petticoat to be attached to; this will also require two buttons on the abdomen, as shown in the picture, and two about three or four inches apart on the back to support it properly. They should be placed on the curve *a*, *b*, in Plate 5. If the drawers are fastened to the bodice, buttons for them can be sewn on between those for the suspenders and those for the petticoat. (See Plate 5, E, F.) The petticoat shown in Fig. 14 is the much-maligned "divided skirt," which I think my readers will agree with me is not such a very dreadful-looking thing after all. It must be obvious that each petticoat that is worn not only adds to the weight of the dress, but also impedes the movements of the legs by constantly pressing

against them in the act of walking. This is one great reason why girls, when walking with their brothers, become fatigued so much sooner than the boys do.

Men complain of fatigue in the same way if they walk in those long ulsters which flap against the legs, and I remember to have read somewhere of a gentleman of a scientific frame of mind, who determined to make the experiment of walking in petticoats in order to estimate the disadvantage under which women labour in regard to dress. He walked for a mile up hill; but was so exhausted by the endeavour that he gave up, with the remark that women must be stronger than men, or they would never be able to stand it. Somewhat in the same strain the *London Medical Record* observed some time ago: "Many women complain of feeling tired after a short walk, whilst they are really carrying a weight which would soon tire a strong man. Their waists are encircled with a belt or hoop, to which a load heavier than a felon's chain is attached, and the shoulders and chest are compressed by an additional burthen. Breathing is laboriously performed, and the contents of the trunk and pelvis are thrust down with a force which, if represented in pounds, would occasion considerable surprise. It would be a matter of great interest if medical men would ask their female patients to ascertain precisely the total weight of the clothes they wear in-doors and out."

These remarks are obviously made by a man considerably ignorant of the mysteries of female

attire—instance what he says about "the belt or hoop," which is apparently a metaphorical representation of the bands with which petticoats and skirts are usually fastened; but they nevertheless are, in the main, true, and the subject is deserving of attention.

I have said that one of the great objects which it is desirable to attain in dress is to obtain the maximum of warmth with the minimum of weight. As already shown, the use of all-wool materials goes a long way towards the attainment of this end; but it may be furthered also by the construction of garments. The petticoats and skirts ordinarily worn are decidedly the heaviest part of the dress; hence it is necessary that some reform should be effected in these.

Ordinarily cotton drawers are worn, and if the legs feel cold, extra petticoats are piled on; moreover, as these articles of dress hang loose from the legs and allow the cold air to get up underneath them, the warmth they give is quite inadequate when compared with their extra weight. By substituting woollen for cotton drawers, we do much to lessen the number of petticoats required; but a still greater advantage may be gained by clothing each leg separately, as the passage of cold air which takes place beneath the petticoats is hereby avoided. This advantage is offered by the divided skirt. As may be seen in Fig. 14, the skirt is very like a loose pair of trousers, and it is made to fasten at the side like buttoned drawers. It may be made of any warm woollen material, or even of

felt, so that in the coldest weather only the one petticoat, if we choose so to call it, need be worn. By the use of this dual garment the back push of the petticoats in walking is also avoided, and the sense of freedom and lightness experienced by the wearers of under-clothing such as I have described is simply delightful. Whether stays are worn or not, the divided skirt may be adopted with equal advantage; it can be buttoned on to the stays just as well as on to the bodice.

The principle of the divided skirt can be carried out in the dress as well as in the petticoat, but this is by no means necessary.

One of the chief battle-grounds of dress reform has for years been the divided dress, or the question of whether each limb should be clothed separately. That it is desirable that the lower limbs should be separately clothed is evident when we consider that by this means an increase of warmth with a decrease of weight is obtained, and we have been advancing towards this end for some time past. On the persons of our great-grandmothers, the petticoat principle, if I may so call it, was carried out to the fullest extent. They did not even wear drawers; but chemises were made long, and the petticoats and skirts clung about the limbs in order to keep them warm.

In the seventeenth century children's frocks were made to reach the ground, and even much later than this trousers were not worn, although in the year 1800 they had already found a place on the persons of one or two "advanced thinkers." About

a quarter of a century later they were adopted by the Court circle and some of the upper ten thousand, but the form of garment was merely casings for the legs gathered into a waistband, and draping the limbs in thin material without properly covering them. Even then nurses and mothers stood out against the "new-fangled notion." "Trousers for girls!" they exclaimed, "quite unnecessary; why, they would look like boys! and such things must be unwholesome." It was in this spirit that the Countess of Mountcashel, who wrote a book upon the care and management of children, said: "It has lately become the fashion for children of both sexes to wear trousers at an early age; but I recommend mothers not to allow boys to wear them under the age of four, and girls—never!" Even the medical world shook its head at the innovation, and, although giving its sanction with some hesitation to children wearing the new garment, maintained that it should be surrendered as soon as girls entered their teens.

It would sound rather odd at the present time to hear one lady ask of another if her "Mary had left off her trousers yet," but it was formerly an equivalent to the question, "Has Mary taken to long frocks?" which we often hear. The medical sages of the old school prophesied that the coming generation would not enjoy the stamina of its ancestors if it adopted customs borrowed from the Sybarite East; and even in the upper classes a considerable section of the male sex viewed the change in dress with dislike. Like all useful innovations this was

violently opposed, nor has the opposition wholly died out even yet. The *Lancet*, in 1879, said, "We consider this article of dress unnecessary, and in many ways detrimental to health and morals." The *Lancet* had apparently taken leave of its senses for once, unless a too-zealous compositor turned what was intended as an affirmative sentence into a negative one: for the majority of physicians will, I am confident, hold with me that the absence of proper covering to the lower limbs is detrimental to health and morals. It was again in a strain of old-fashioned intolerance that, writing on the Rational Dress question in 1883, the same journal remarked, "That monstrosity of fashion the divided skirt is an outrage not to be countenanced—an unnatural costume which must be productive of unwomanly ways which are to be deprecated. Moreover, as it approaches the trouser in form and in use, it must engender an increase in the heat of the body which is most undesirable." It is a pity that so excellent and high an authority as the *Lancet* should have stooped to express such hasty and evidently ill-considered opinions. It seems probable from the above that the writer had never even seen a divided skirt, and he was certainly ignorant of the plan and purpose of its construction.

The general adoption of drawers as an article of dress was due to a freak of fashion. When, owing to Royal example, the fashion of distending the skirts with hoops was universally adopted alike by princess and peasant girl, this distension

of the petticoats rendered it absolutely necessary to cover the legs, and the pantaloon became universal. Children's frocks had for a long time been made quite short, and when the little skirts were by means of hoops set out from the figure, it became necessary to have an efficient covering for the sake of appearance, as well as to prevent cold from striking the body; this led to more substantial drawers being made and fastened at the side, according to the present fashion for children.

When drawers were thus adopted chemises were shortened, and this was the first step in the evolution of the divided dress. Afterwards came the Bloomer movement, when it was boldly affirmed that European ladies should take a lesson from their sisters in the East, and adopt Oriental trousers; but the feeling against the Bloomer costume was very strong, for though it had many good points about it, it represented too violent a change from the fashion of the time, and ladies would not adopt it for fear of appearing ridiculous. Reform, as I have said before, to be effective must be gradual, and it takes some time for the public to become accustomed to a new idea even in dress.

Ever since the Bloomer costume, however, the idea has been gaining popularity, although but slowly, and at the Health Exhibition at South Kensington several divided dresses of the most pronounced type were shown, and met with favourable comment; some of these were very attractive, some not. For example, the Rocky Mountain

travelling costume, devised by Mrs. Bishop, however useful it may be, is certainly far removed from the beautiful. It is made of dark cloth, with a skirt to the knees, below which appear a sort of Turkish trousers gathered in to the ankles and finished with senseless little frills pinked out of the cloth. But this kind of dress need not be either ugly or absurd. Mrs. Fleming Baxter exhibited one also intended for highland and mountaineering use, which is really charming. It is made of dark blue cloth with gaiters, knickerbockers, a skirt reaching to the knees, and a very pretty short coat like a gentleman's shooting-jacket, with a hat to match. This is a fair type of the kind of dress to which I now refer, and many similar ones have been seen at various times, differing in unimportant details. Dresses of this sort save the wearer from the friction and weight of long skirts, which form an impediment to the movement of the limbs, and are the means of wasting a considerable amount of energy. They, moreover, clothe the body evenly and warmly, and are comfortable as well as light. Thus, from a health point of view, these dresses are excellent. They are, moreover, extremely *chic;* but, unfortunately, they are attended with that great disadvantage inherent in all dresses of the kind—that those ladies who first were brave enough to attire themselves in this way would be called, not *brave*, but *bold.* The same objection applies to the costume made by Mrs. Louisa Beck, of 24, Connaught Street, Hyde Park; but in this case it can easily be removed, as

I shall presently suggest. She calls this very effective costume her "trouser dress." In the materials of which the one exhibited at the Healtheries was made it would be very suitable for summer wear. It is extremely light, weighing altogether only 3 lbs. 2 oz. It consists of the cut-away coat, fastening at the throat, according to present fashion (see Fig. 16); the waistcoat and collar are of ruby-coloured velvet, and a large bunch of ribbon velvet bows make a very pretty finish at the throat. The skirt falls in loose double box-plaits more than half-way down the calf, and below it the trouser legs show for three or four inches. The coat, skirt, and trousers are made of pale grey beige. The objection to this dress could be entirely done away with by making the skirt an ordinary dress length, so as to hide the trousers. Of course, lengthening the skirt in this way reduces the dress to the condition of a divided petticoat, such as I described in my last, covered by an ordinary dress skirt, with the exception that the trousers are longer, and fit more closely to the legs than the petticoat shown in my illustration, and I may add that this is an advantage, for the closer the under garment hangs to the legs the warmer it feels. Divided dress skirts may, however, be made so artfully that an outsider would not know the difference between them and an ordinary dress. A lady friend of mine, wearing one for the first time, told her son what it was, and met from that youth the consolatory, if not elegant rejoinder, "O bosh! You don't come that sort of

hoax on me." An arrangement of the dress material prevents the division being obvious, the ends of the two skirts being finished with kilted flounces,

Fig. 15. Fig. 16. Fig. 17.

which fall into each other, and look like one flounce. A really elegant walking costume in cashmere and silk, with divided skirt, was shown by Mrs. Beck

at the Healtheries, which hardly differed in appearance from an ordinary dress.

Many people are curious to know what the divided skirt is really like, and, as a matter of curiosity, I am pleased to be able to publish the above illustration, which has been kindly lent me by the Rational Dress Society, and which represented the divided dress as advocated by the Society.

The young ladies in this picture do not, as far as I can see, look in the least unwomanly in spite of the *Lancet's* dictum on that point. Dresses made in this way are doubtless very healthy, but there is an objection to them in the fact that the lower part of the skirt wears out very rapidly owing to the friction between the legs in walking.

With the system of under-clothing I have described, however, there is no great objection to the dress being made in the ordinary way, provided it is not too heavy. It should not weigh more than four pounds for any growing girl, and for little girls it should weigh very much less than that, being just as light as possible. The trimming then must not be heavy. Beaded trimmings must be avoided, but embroidery and lace do not add much to the weight of dresses, and greatly increase their elegance. It is not necessary, however, that growing girls should be elaborately dressed; and indeed the more simply they are clothed the better, both from the point of view of health and of good taste. They should not be dressed in velvets or velveteens,

as these materials are heavy without being particularly warm.

It is quite possible to dress in a perfectly healthy way, and yet retain the semblance of fashion.

The best form of dress is the Princess robe, the weight of which is equally distributed, as, being cut all in one, the weight of the skirt depends entirely from the bodice. Dresses cut in this way may be trimmed in any style, so that they may look fashionable, even when the Princess robe is not in vogue. If this form is not adopted, the dress skirt should be fastened either to the dress bodice or the under bodice, but never hooked round the waist with a narrow band, according to the prevalent mode. For those whose figures are formed, dress skirts may be made with shaped bands to fit over the hips, as in this case the weight falls properly on to the bones of the pelvis. (See the shaded portion on Plate 5, E, F, *a*, *b*, *c*, *d*.) Fancy belts should never be worn outside the dress, as they are too apt to be tightened.

A word now about the fitting of dresses, and these remarks will apply equally to the bodice, of which I have already spoken. The great difficulty in fitting garments is to prevent the movements of the body being cramped. This difficulty is entirely obviated if jerseys are worn, and I therefore strongly recommend them. Their adoption in the case of growing girls is beneficial, not only from the point of view of health, but also from that of economy; for, if ordinary dress bodices are worn and fit as they should, they are very soon

outgrown, and must then be given up, or they will prove injurious.

For growing girls the expanding dress, made by Mrs. Beck, is most suitable; by a peculiar arrangement of gathering in the front of the body, the dress expands as the body moves. It is so elastic that it expands as the lungs inspire and contracts as they expire, this renders the dress extremely healthy and suitable not only for growing girls as a point of economy, but also for singers and violinists, who respectively require freedom for their chest and arms. Mrs. Beck is to be recommended not only as a maker of hygienic specialities of her own invention, for which she has taken medals at the Exhibitions of the Rational Dress Society and of the National Health Society in 1883, and at the Health Exhibition of 1884, but also as conscientiously following out the instructions of her customers, and fitting well; she is, in fact, not to be classed under the head of ordinary dressmakers, of whom I am about to speak.

Dresses should fit loosely enough to allow full expansion of the lungs, and yet not too loosely, or their weight will not be properly distributed; and here it is necessary to observe that a dress which may fit properly in one position of the body may be unduly tight in another. Dressmakers always fit their customers standing up, but from the following measurements of a girl's figure it is obvious that this custom requires some reform. For standing erect with little air in the lungs the waist measured twenty-one inches; with the lungs fully expanded,

twenty-two and a half inches; and stooping forward with the lungs still expanded, no less than twenty-four inches. Now, as a great part of a girl's time is unfortunately spent in stooping over books, drawing, or the pianoforte, it may be readily understood that this natural thickening of the waist should be allowed for in her clothing. When a dress is being fitted, the girl should be made to put herself into a variety of positions in order to see whether it is perfectly comfortable in all of them.

In order to prove whether dresses already in wear are of the proper dimensions, the mother should measure her child's waist in the morning before she has dressed, so that there can have been no previous compression, and with the lungs fully expanded, and then compare this measurement with that of the dress. Dresses which have been outgrown, unless they can be let out, must be given up at once, although frequently slight alterations will permit them to be passed on to a younger sister.

The dress bodice should always permit both arms to be raised straight up above the head, and this position should be tried when they are being fitted on. Some of the prevalent faults which prevent this movement being accomplished are that the dress is cut too long on the shoulder, and too tight in the armholes, while the side seam is not long enough from the waist to the armpit, and, if the plan suggested be adopted, these can be remedied in time.

Sleeves cut high, mounted, and fulled on to the shoulders according to the recent fashion, give great freedom to the joint, and are very comfortable; it is therefore a great pity that Fashion is apparently regretful of having been sensible for once, and that the sleeves are gradually returning to their former flat condition, for a distinct retrogression may be observed in this respect.

We may do well to follow the method of cutting sleeves in vogue in 1883-4; but sleeves should never tighten on the arm, for, besides the discomfort of this, and the restriction of movement, the circulation is interfered with, and the hands become cold, or swell, and get red.

The ideal of a "good fit" which most dressmakers hold is to reduce the arms and figure to the resemblance of a tightly stuffed pin-cushion; but this is an ideal by no means consistent with health or the definition of beauty I have been concerned to maintain.

The fitting of a dress is a thing not to be hurried, and mothers should carefully supervise it themselves, for dressmakers are shifty folk at the best; and, as it is generally easier to do anything badly than well, the children will suffer from neglect in this respect.

It wants both knowledge and firmness on the part of the mother to get a dress properly made; for the maker, as a rule, has a powerful store of arguments by which she defends her errors, and the genus dressmaker is too apt to keep the genus lady in a state of hopeless and miserable subjection.

I think it is time that we should strike against this tyranny, and refuse to employ any *couturière* who will not allow us to have some voice in the construction of our own garments. Why not form an Anti-Dressmakers' Tyranny League, something in the same style as the Early Shopping Association? Surely we have our rights as well as the lower classes, although philanthropists too generally ignore them.

CHAPTER XII.

DRESS FOR OUT OF DOORS.

CONTINUING my remarks as to the proper fitting of dresses, I would observe that special care is required in fitting them round the throat. If they are cut too tight the muscles of the throat do not get full play, breathing is hampered, and the movements of the larynx checked; the mode in which the voice is produced is thus altered, and the voice becomes harsh and weak, while the low notes are spoiled. All singers insist that the movements of the throat should be quite untrammelled. If the dress is cut too high at the back it presses on the lower vertebræ of the neck, and pushes them forward, so that the neck and head protrude in a way that is as ungraceful as it is unhealthy. It must not be forgotten that the upright position is the most graceful, and the healthiest. When the dress is being tried on, throw the head back as far as possible, and if the bodice is too high to permit of this it must be cut low enough to do so. In front it should just cover the clavicles or collar-bones, and the back

will be about right if on a level with this. The collar of the dress, if one is worn, will of course be sewn on above this line. While strongly opposing low-necked dresses, I am sorry to see that just now it has become the fashion to wear all but evening dresses so high in the neck that nothing of the throat is visible. This plan would perhaps not be objectionable in the winter if with the height of the covering there was no accompanying tightness or stiffness; but laces swathed round the neck are often fastened too tightly, and high collars of starched linen are in every way objectionable, preventing ventilation, hampering circulation, and being incapable of absorbing perspiration. The "Masher" collar is a thing to be avoided with horror—a very instrument of torture, and ladies should not be induced to wear it, even if their male relations have sufficiently taken leave of their senses to do so. If linen collars must be worn, as for riding, they should be large and not too high. Turn-down collars, like boys' Eton collars, look neat on the dark habit.

Tight collars and cravats round the neck cause headaches, by interfering with the circulation, and when the veins of the neck are swollen, as during drunkenness, by their preventing the return of blood from the head, a sort of apoplexy may result and death follow. It was not without reason that our grandfathers kept a boy or attendant to loosen their neckcloths, and those of their drunken guests, as in due course they subsided under the table

after dinner. About fifty years ago elderly gentlemen usually wore a high, tight collar, reaching partly up the cheek, with a couple of cravats wound round; younger men wore also a high collar, and one silk cravat twice round. After 1848, similarly stiff collars were still worn; but the tie now was single. Then came the epoch of the low collar with the throat left free, and this fashion has ever since been maintained by some, although the tendency of late has been to revert to the bad old custom of obstructing the free movement of the muscles of the throat by walls of starched linen, which rasp the skin and spoil the voice. The sooner men take to a better way of clothing their chests and necks than with stiff linen shirt-fronts and collars the better; but for health's and reason's sake do not let us copy them in the present error of their ways.

Nothing is more becoming than lace in the neck, and if anything is wanted this should be used; or a fold of fine lawn just to show above the collar of the dress is very pretty, although, if the collar is of velvet, it is quite allowable not to wear even this. Instead of the high stiff collars worn for riding, I would also suggest that a fold of lawn, or of a white silk neckerchief, if nicely arranged, would look quite as well, and be infinitely more comfortable and healthy.

Coming now to the question of out-door clothing, I would call attention to the fact that tailor-made jackets are far preferable to the fashionable dolmans, which bind the arms down to the sides in a

most uncomfortable and objectionable way, and in which the shoulders are frequently drawn forward, diminishing the capacity of the chest. Jackets or ulsters should always be worn by growing girls; they should be fitted like dresses, and should not be of heavy materials; heavy cloths are generally weighted up with cotton or rubbish.

Tweeds and the soft Scotch Cheviot cloths make good walking dresses, and ulsters or jackets. The tailor has generally a good selection of them from which to choose, and they should be chosen for their lightness and warmth. Very pretty tweeds are now made from two colours of the natural wool, and are consequently preferable to dyed materials. All garments which can be made by a tailor should be so made. For tailors are not only more accurate in their fit than dress-makers, but they are also more attentive to instructions, and less "pig-headed," if I may be allowed to use that very suggestive expression.

When furs are worn, as they may be with advantage in cold weather, provision ought to be made for their ventilation. Heavy trimmings for jackets, as for dresses, should be avoided, and the bead trimming, now so fashionable, is especially unadvisable in this respect.

For bonnets or hats, bead trimmings are also bad, as their weight on the head is most pernicious, and the charming light summer hats and bonnets now in fashion are too frequently spoiled, from a health point of view, by the addition of a quantity of beads.

Artificial flowers, of which such beautiful specimens may now be had, make an elegant, becoming, and fashionable ornament, and are strongly to be recommended for the outside of bonnets or hats; they should not, however, come in contact with the skin, as their lovely colours are too often produced by the aid of very poisonous dyes.

The head, unless in extreme climates, does not require a very warm covering. As I have said, man requires clothing because he has not the natural protection of wool or hair possessed by the lower animals; but on our heads we have a natural protection in the shape of hair, and it is considered a beauty if we have this in considerable quantity.

The reason why we have hair in abundance on our heads alone is interesting, not only from an evolutionary point of view, but also because it teaches us a lesson in the choice of head-gear.

When speaking of the ways in which we lose heat, I mentioned that, among others, we lose it by convection—the rising of heated particles. Now, in this way, heat is naturally lost chiefly from the uppermost surface of the body, and we consequently find that most land animals have their hair or wool thicker on their backs than on their bellies. The particles of air heated by their bodies, which, having become more elastic in the process of heating, have a tendency to rise and give place to colder particles, are entangled in the hair or wool, and thus adhering to the body, make it a small warm atmosphere of its own; for air is a

bad conductor. In hot climates also we find the hair thick on the backs of animals, and the negro's head woolly, because hair is a non-conductor; and here it serves to protect from the heat of the external world. The top of the head in man occupies the same position, as the uppermost surface of the body, as the back does in quadrupeds. Now, if the protective qualities of the hair are rendered unnecessary by extraneous aids, the hair, having no longer a use, will tend to fall off.

It has always been noticed that scholars and those who work their brains hard, lose their hair very early, and I believe the cause of this is that, having a constant over-supply of blood to the brain (for, as we know, the greatest quantity of blood goes to the organ most in use), the head becomes over-hot, and the hair falls off, in order to provide a sort of natural safety-valve by which the surplus of heat may be got rid of. The close covering of the head with hats and caps is also a prevalent cause of baldness. Such baldness is a common characteristic of the Turks and the Spanish Jews, for among these peoples the head covering is never removed, and is only changed at night. This perpetual covering, carried on from the earliest infancy, when a well-wadded cap is tied under the baby's chin, retards the growth of the hair, and hastens its fall; and the transmitted tendency becomes an hereditary cause of baldness.

It is noticeable that in England baldness is most common among the upper middle classes. The

poor, as a rule, if cleanly, have very good heads of hair, because they are generally uncovered in the open air; but it has frequently been observed that, looking down at the stalls in any theatre, the vast majority of their male occupants over thirty years of age have heads as innocent of hair as the backs of their hands. Besides the mental work of men in this position, there is another great cause for their baldness. Stockbrokers, merchants, and others engaged in the City wear tall hats, both in their offices as well as out, all day long, as a matter of form, and almost of etiquette. This may appear almost incredible, but it is none the less true. A young friend of mine, calling on business on a stockbroker, as habitually, removed his hat on entering the office; but, before he had been there long, the owner remarked: "You had better put on your hat, or people will think you are quite ignorant of city customs."

The tall, stiff hat, whether silk or felt, is a most insanitary article of dress. It presses on the arteries entering the scalp, and so lessens its blood supply, interfering with the nutrition of the hair. It is practically impervious to air, of which it contains a certain quantity that soon becomes poisoned by the excretions of the skin of the head.

Air is, moreover, as I have said, a bad conductor, and the air in the hat becomes heated with heat from the head, which, not being able to rise through the hat, it retains. It also becomes charged with moisture given from the skin, and the hat is so constructed, with a leather round the edge, that

this cannot be absorbed, and frequently runs down on to the forehead in a most unbecoming way.

Thus the high, stiff hat envelops the head, as it were, in a hot-air poultice, and it is small wonder, after what I have said, that the hair is spoiled by this treatment. The same remark applies to riding-hats worn by ladies, and in a less degree to felt or straw hats. All hats should be properly ventilated. If you cannot blow through their structure, small holes should be pierced, or eyelets inserted, and these by no means injure the appearance of the hat.

The so-called ventilators which many hatters insert into the crowns of their hats, and which consist of a simple eyelet-hole covered with wire gauze, are perfectly useless. Ventilation is impossible unless the air can circulate, and for this to take place there must be at least one inlet and one outlet ventilator. The air in a chamber or recess, open at one point only, remains stationary. Hence it is necessary that at least two eyelet-holes should be inserted in every hat, and these must not be covered by the trimming; they should preferably be placed on opposite sides of the hat, or two or three small holes can be pierced symmetrically in the same position. In riding-hats or others trimmed with a band of thick ribbon, the ventilating holes should be just above the level of the ribbon, and the same remark applies to men's hats.

Leather, oilcloth, or other impermeable head linings should never be worn, as, besides not ab-

sorbing the perspiration, they are very hot to the head. Excellent head linings may be made of flannel, cashmere, or even of sarsenet, or what is called silk-serge, with a coarse flannel at the back to give the necessary thickness, and act as an absorbent. Head linings should invariably be white or the natural colour of the material, as dyed stuffs in this position are especially liable to be dangerous, being readily acted upon by the perspiration of the forehead.

An advantage of not having a smooth-faced lining to hats is that the hat need not fit so tightly, for if the surface be somewhat rough, the hat will be supported by friction against the hair and skin. Hats should be perfectly fitted to the shape of the head, but should not be made tighter than is absolutely necessary. The soft-fitting brims are to be recommended, as they are more pliable to the shape of the head than hard brims.

In the matter of hats people are unfortunately very much at the mercy of the hatter, and I am therefore very pleased to be able to say that I have converted at least one fashionable hatter to rational views on the subject. My own hatter, Mrs. White, ladies' hatter, of 63, Jermyn Street, St. James's, has consented to adapt her hats to the principles here laid down; and her husband, gentleman's hatter, of 74 in the same street, has promised to do the same as regards the head-gear of the sterner sex.

If veils are worn, they should be of plain net or tulle, as spotted net is apt to dazzle the eyes. The

veil should not be tied tightly, or it will break and spoil the eyelashes; but I do not agree with those medical men who would abolish its use altogether, for in windy and dusty weather, or when travelling, I find a thin veil is a great protection to the eyes.

Gloves, like other articles of dress, ought to be pervious to perspiration and transpiration, and they ought not to fit too tightly, or the circulation will be impeded, and the hands will feel cold and swell. Suède gloves, although by no means perfect from a sanitary point of view, are better than kid; silk are better than Suède, and woollen gloves are better than either for use, if not for ornament, and there is no reason why growing girls should not wear them, although I can understand that their grown-up sisters would not wish to emulate them in this respect, on the grounds that woollen gloves are "so dowdy." I have seen buckskin driving and tricycling gloves ventilated by means of eyelet-holes, and this is a very good plan.

When in Chapter II. I spoke of the functions of the skin, I endeavoured to show how very important it is that they should be in no way impeded, and that no reabsorption of excretive matters should take place. For this reason mackintoshed or waterproof articles should not form articles of ordinary dress. I referred briefly to this subject when speaking of infants' clothing (p. 69), and I should add also that the waterproof dress-preservers which most dressmakers insert beneath the arms are injurious. They certainly prevent the

perspiration from injuring the dress, but by preventing evaporation they allow the underclothes to become soaking wet and cling to this part of the body, which is very sensitive to cold; thus they frequently give rise to chills, besides which they probably permit some reabsorption of poisonous matters.[1] That this is so is indicated by the fact that heat and feverish restlessness quickly follow the use of a close waterproof dress by sportsmen and others. Hence waterproofs should only be worn when it is absolutely raining, and be taken off when the shower is over. The circular waterproofs, which do not fit closely, are very good, and also those with loose sleeves or with a ventilating arrangement under a cape. They should be as light and thin as possible, so as to be easily portable and not warm enough for a chill to ensue on their being taken off. Every means for ventilating them should be adopted.

In this connection, it is most satisfactory to learn that by being subjected to a process called "Warnerizing"—a process discovered by an American lady named Warner—all kinds of articles of dress, from tweeds and cloths to silk hats, velvet, and lace, may be made "water repellent," so that

[1] The best plan to preserve dresses under the arms is to tack in pieces of cotton wool, or doubled flannel. These act as preservers, but absorb the perspiration, and can, like the hat linings, be changed when soiled. I have found this plan answer well even with the lightest evening dresses which are submitted to more than ordinary danger, owing to the free perspiration in the armpits, caused by dancing and the heat of crowded rooms.

rain can hurt neither them nor their wearers. To think that ordinary outdoor garments can thus be made thoroughly waterproof seems almost too good to be true; but it seems to be true, nevertheless. Articles submitted to this process were exhibited at the Health Exhibition of 1884, and they were said to be quite pervious to air. Since that time a "Warnerizing" Company has been formed, and has, I believe, taken offices in Queen Victoria Street, London, E.C.

CHAPTER XIII.

SUITABLE DRESS FOR EXERCISE AND SPORTS.

THE question of suitable exercises and games for women, and more especially for growing girls, is one well worthy of consideration, for it is of the greatest importance not only to individuals, but also to the State, that we should develop a healthy race of women. That our girls are badly in need of physical education is certain, and at the present time, when mental overwork is the rule, not the exception, a strong feeling prevails in favour of the necessity of muscular exercise.

People judge rightly that it is injurious to exercise the brain inordinately to the neglect of the rest of the body; but then they straightway rush to the other extreme, and prescribe cures so violent that the patients would be better without them. At the Healtheries during the summer of 1884 I several times witnessed exhibitions of the Ling system of gymnastics as practised by girls in some Board Schools. Many of these exercises are practised on apparatus, and climbing plays a great part in

them. Some of the girls twisted themselves in and out of ladders made for the purpose, ascending to an almost dizzy height, and letting themselves down very rapidly. I cannot now describe these evolutions, but doubtless many of my readers have witnessed them.

The point to be emphasized in this connection is that the rough gymnastics generally practised on apparatus, the climbing and swinging from the hands and feet, the vaulting and parallel bars exercises, though they may be highly fitted for athletes or sailors, and may even not be injurious to the stronger individuals among Board School girls, are most unsuitable for the weaker individuals and for young ladies whose inherited constitutions are not fitted for very rough work of any kind. Further, I wish to insist that, before violent exercise of any kind is undertaken with a view to promoting health, a thorough medical examination should be undergone, as, without the patient being aware of the fact, organic disease, or a tendency to such, may exist which would render such exercise injurious, or perhaps fatal.

Two typical cases in illustration of this have come under my observation recently. I was giving a course of simple lectures on physiology and hygiene at a club for working girls, which boasted much of its gymnastic classes and apparatus. After the lecture the girls often consulted me as to various symptoms from which they were suffering. One girl, sixteen years of age, I found to have heart disease, and a woman aged twenty-

eight had an aneurism. I asked both if they went in for gymnastics. The girl said, "Yes; I enjoy them very much." The woman said, "I haven't been doing much in it, for I'm not very strong; but I think I must go in for it more, and that will do me good." Both were extremely surprised when I absolutely forbade them to take any violent exercise whatever.

I could not explain to them that if the woman at any time gave a sudden jump or a venturesome swing her aneurism would probably rupture, an accident which would be followed by almost instant death, or that, if the girl took an unusual amount of exercise, or excited herself extraordinarily, her heart would suddenly stop action, never to beat again.

It is not long since a young lady, previously considered healthy, died suddenly in the gymnasium of one of our best girls' colleges. A young lady friend of mine, who was present, tells me her schoolfellow dropped dead from the ladder on which she had been exercising, and this is exactly the result I should have expected in my pupil had I allowed her to continue her gymnastic operations. If the young lady's parents had had her properly examined by their medical man, her life would not have been sacrificed in the attempt to preserve health.

While thus commenting upon the abuse of gymnastics, it must not be thought that I underrate their value, for especially in London, where playgrounds are small and few, a good gymnasium is a

great advantage, but it ought to be used with due precautions.

Excess is the fashion of the day, and there is a very marked tendency to carry everything to extremes. In accordance with this, being once possessed of the idea that muscular exercise is beneficial, the majority firmly support the old but extremely fallacious proposition, that "You can't have too much of a good thing." For example, lawn-tennis is one of the best, safest, and most healthy games ever invented, but not a summer passes without my seeing a number of girls who have made themselves ill by playing it, simply because they insisted on playing all day and every day.

Men carry healthy games to equally unhealthy extremes, and many are the victims of over-addiction to cricket, boating, race-running, and football.

Sir William Gull once said, in his report on the physical health of the candidates for the Indian Civil Service: "The men who have been rejected have not failed through mere weakness of constitution, but (with only a solitary exception or two) from a mechanical defect in the valves of the heart in otherwise strong men, and for the most part traceable to over-muscular exercises."

Again, people unaccustomed to much exercise will perhaps make up their minds that a long walk will do them good; but unusual exertion will, in reality, do them harm. I have known young men who have led a sedentary life for months, perhaps preparing for an examination, begin the vacation

with a walking tour, in which they have marched twenty miles or so in the day, and which has resulted in a serious illness, directly traceable to the sudden strain upon the system.

In respect to long walks, girls try to emulate their brothers, with disastrous effects, forgetting that the difference in their constitution and education renders it impossible for them to perform with ease and advantage feats such as the boys or young men can perform. In short, failing to recognize that excess in any direction is bad, we fly from one evil to another.

It seems a well-established physiological fact that the same effect may arise equally from the absence of certain conditions and from their presence in too great a degree; for example, we may become anæmic from over-exercise or from want of exercise, and from this fact the golden lesson may be drawn—distribute your conditions equally, and you will get a well-balanced result. Now, this is exactly what is wanted, and we may take the "well-balanced result" to mean, in the case under consideration, that "consummation devoutly to be wished"—a healthy mind in a healthy body. If any one should say, "The mind is what makes the man; therefore let us consider the mind only," he is wrong, for it is impossible to have a healthy mind without a healthy body. Disease or weakness is sure to creep out somewhere, and at some time, though it may be well and long concealed. On the other hand, if any one should hold that "the body makes the mind; let us, therefore,

attend only to the body," he is equally wrong. For by so doing might be produced a very fine animal, but yet one deficient in those characteristics which constitute the superiority of man over those animals nearest him in the scale of evolution.

In either case the balance of power would be lost, and whether the scale dips on one side or on the other, it matters little, for evil results in either case.

Body and mind should always be considered in relation to one another; and, as far as it is in our power, we ought to counteract the tendency which each has to over-balance the other.

Gymnastics are doubtless of great service in aiding the development of young girls, provided that proper precautions are taken. Of dresses suitable to gymnastic exercise I need say nothing here, as I have already given the necessary particulars on pp. 101 and 172. But, desirable as gymnastic exercises may be, they should never be allowed to supplant out-door games, if these are possible.

Fresh air and sunlight are the best medicines, and the pleasure of a good game is in itself an agent in promoting health, to the position of which no system of gymnastics can attain. If care is taken to avoid over-exertion and fatigue and not to indulge in them when unwell, all the sports I mentioned above may be beneficially enjoyed by girls and women as well as by boys and men. From this statement I must, however, except the game of football, which, as at present played, is not only unfit for girls, but also for young men unless

they aspire to the profession of prize-fighters, and take no account of such trifles as broken arms and legs, injured spines, and the chance of sudden death from a blow on the head or a kick in the stomach.

LAWN-TENNIS is perhaps the best game for girls, but the left arm should be exercised in it as well as the right. This requires some practice; but it is quite possible to play equally well with both arms. For this and other games which require the player to run easily, divided skirts are very comfortable. Provided the sleeves are made as I have described (page 190) so as to allow free movements of the arms, no special dress is required for this game; but jerseys are very comfortable to play in, and on the whole the prettiest tennis-dresses are those made of white flannel with loose sailor bodices, or like those shown in Figs. 15 and 17 in the illustration on page 185. The expanding dress described on page 188 is the best dress for lawn-tennis of which I know. It is charming in white cashmere or flannel.

CRICKET is also a very good game for girls, and the same remarks as to dress apply to this as to lawn-tennis. It is necessary, however, that girls who play cricket should have a protective pad to be worn over their bosoms, in order to prevent any harm which might possibly arise from a chance blow from a cricket-ball. A loose, well-wadded pad can be placed between the dress-body and the underclothes; it may be kept in place by two bands on either side, one passing above and one beneath each arm, and fastening at the back. This plan will, I think, be

preferable to having the bodice of the dress, the under-bodice, or the stays wadded, as if the pad is loose it can be removed when the game is not being played. It should not, however, be removed immediately after playing, as this might cause the player to take cold on the chest.

The following remarks made by the *Lancet*[1] on this subject will be read with interest not only for the soundness of the principles involved, but also as showing that that valuable journal is more tolerant on the subject of "female emancipation" than might have been supposed from the passages quoted on page 181 :—

"The announcement of a cricket match between an eleven of ladies and an eleven from a girls' school has caused an apprehension in the minds of some of the risk to which feminine players are exposed. One correspondent points out the consequences likely to ensue from a blow received on the breast from a cricket-ball, either delivered from the bowler's hand or struck by the bat. Doubtless a severe blow on the breast might lead to serious consequences in fully developed women by excitation of any latent tendency to cancer, and in young girls by arresting the development of the mammary gland. Still, we think, the risk might be reduced to a minimum if the feminine players wore a well-padded corset both in the field and at the wicket. We should regret that a game, really well suited as an exercise for girls, should be discouraged simply on account of a risk that could

[1] July 4th, 1885.

be guarded against. We have repeatedly in our columns advocated the advantages to be gained, in the physical education of girls, in the introduction of a well-regulated and moderate athleticism—by allowing them to join in pastimes at present mostly limited to boys, such as swimming, rowing (not boat races), and cricket. The thorough development of the female frame which such exercises would induce, would, we are sure, do much to diminish the tendency towards the special diseases which so many women suffer from in after life. One positive advantage would be gained, by the abolition of tight stays and high-heeled boots, which would be impossibilities for young ladies who wished to enjoy athletic pursuits even in moderation."

Almost all athletic sports and games can be enjoyed without making any great change in dress, if the system of clothing I have sketched in the preceding pages be adopted; but I would impress upon those who indulge in out-door games, rowing &c., that when they are warm and sit down to rest after exertion they must throw some warm wrap round them, or they will most probably take cold.

RIDING.—Many improvements have taken place of late in ladies' dress for horse exercise. The long habits formerly worn were alike objectionable and dangerous: for they became soiled and splashed when riding on wet roads or across country; and by catching against chance objects frequently led to the rider's being thrown or injured. In case of accidents, also, they were very

much in the way, entangling the rider's limbs, and embarrassing the horse's movements if it fell.

The skirt should not be longer than just to cover the feet, and the material chosen should be as light as possible. From angola, tweed, or serge, much more comfortable habits can be made than from heavier cloths, and the waist is thus saved from the drag of a heavy skirt. For the same reason the upper portion of the skirt and trousers should be well shaped to the figure, as shown in the shaded portion of Plate 5, E, F.

There is perhaps no exercise more agreeable and health-giving than riding, especially if it is possible to quit the dust and stones of the road, and the monotony of the "Ladies' Mile" for a canter over breezy downs, or a turn across country with the hounds. In the open country, however, where the ground is uneven, and there is frequently some obstacle in the shape of a fence or ditch to be cleared, an exceptional strain is put upon the abdominal muscles and internal organs of the body.

This fact is so far recognized by physicians that many of them recommend that growing girls should abstain from equestrian exercise from the time that they enter upon their "teens" until they have attained their full growth.

An hour's continuous lesson in riding will make many ladies feel "saddle-sick," and this is especially the case after trotting for any length of time upon a horse whose paces are at all rough. When this feeling is induced the rider should at once

dismount and rest: all painful sensations, as I have before remarked, are danger-signals. Others suffer from the exterior of the body being chafed while trotting, and care should be taken to avoid or remedy this, as the irritation caused thereby sometimes considerably affects the health.

Owing to the strain on the internal fibres, of which I have spoken above, it is very desirable that the abdomen should be supported during horse-exercise. A number of belts intended to supply this support have been devised by corset-makers and others; but the majority are unsuited to the purpose for which they are intended, being stiffened with steel and whalebone, and merely encircling, and perhaps compressing the body without supporting the abdomen. The position of a lady on horseback also tends to push them up towards the waist.

Very much may be done to give comfort and safety in riding by the judicious shaping of the upper part of the trousers, which should follow the contour of the body sufficiently to give the *upward* support which is needed. As I have remarked,[2] ordinary corsets press the abdominal organs downwards instead of supporting them, and hence they are particularly unsuitable for equestrian wear. Very good abdominal belts for riding may be shaped to the figure out of flannel, which should be doubled and bound at the edge with silk ribbon; they can be fastened like the baby's binder, described on p. 53; they may have a broad strip of elastic inserted

[2] pp. 165-6 *et seq.*

throughout the whole depth on each side, and this will enable them to be fastened firmly round the body. A shaped band may also be knitted or crocheted out of coarse Berlin wool, as mentioned in the same place; and the elasticity of this will also permit it to fit closely, and make a firm, yet pliable support. These belts may be worn with or without corsets.

The best belt I have seen for riding is, however, that shown in the figure below. It is made by Mr. Bourne, of silk elastic loosely woven so that there is proper allowance for transpiration, and has but three whalebones in front, which may be removed if desired; the bones at the back should be retained, as they give support just where it is wanted in riding.

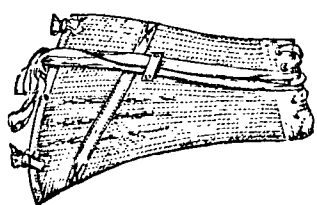


Fig. 18.

For riding, as for other exercises, the body should be clothed entirely in wool. The habit should invariably be lined with flannel, and this plan is successfully adopted by my own tailor, to whose work I shall presently refer. The trousers as well as the jacket may be thus lined throughout, and when this is done, all the underclothing that is required is woollen combinations, with perhaps the belt as described, or the belt and stays in the case of those inclined to *embonpoint.*

The conventional "chimney-pot" hat answers no profitable purpose, and catches the breeze when

one rides fast; if worn, however, it should invariably be ventilated and lined on the principles described (pp. 199, 200). To my mind hats of the shapes shown in Figs. 19 and 20 are much more becoming and prettier than the conventional riding-hat. Mrs. White makes both these shapes in soft elastic felt, and they are therefore exceedingly comfortable and healthy. They look well in black, but are charming in light grey or dove-colour, to match habits of the same hue. Of course light-coloured habits are healthier than dark ones, in accordance with the facts mentioned in Chapter VIII., but whatever colour be chosen for the habits, these

Fig 19.

Fig. 20.

hats can be made in felt to match. The brim should be wide enough to shield the temples and nape of the neck from the sun, and when the sun is very strong a "puggaree" should be added to serve the same purpose. Indeed, in all out-door exercise when it is impossible to hold up an umbrella or parasol this rule should be observed, for the sun's rays beating down upon the nape of the neck are very apt to cause sunstroke, a dangerous affection of the brain resembling apoplexy, and which is generally followed by serious after-effects.

TRICYCLING.—The tricycle affords both healthy and delightful exercise for women, for whom it is especially suited by the absence of jolting, and the

manner in which the body is supported, which two characteristics render it more healthful for our sex than horse-riding. There are certain times, however, when both horse-riding, tricycle-riding, and other exercises should be avoided by women, but their own sensations and common sense should guide them in this respect. Similarly beginners should only ride for short spells, say half an hour at a time; but after some practice rides may be extended, until in a few weeks the tricyclist will be able to accomplish twenty miles at a stretch with less fatigue than she would feel from walking a quarter that distance.

In tricycling the weight of the body is supported lightly upon a saddle, which is mounted on easy springs; the legs are thus freed from its weight, and at liberty to exert their motor power on the treadles. The muscles of the upper part of the body are called into play in the work of guiding the machine by the handles, and in pulling on these in going up hill the body is steadied, and the legs have additional force put into them. Thus much for the muscular exercise; but the mental advantage is equally great. The attention required to steer the machine is sufficient to distract the mind from wearisome thoughts. The rapidity of the motion not only causes a pleasant breeze to play about the face and fill the lungs, but brings about a rapid change of place and sights, and consequently of ideas. The motion can be rapid or slow, and can be instantly changed, which gives the rider a pleasant sense of power.

In short, all these and other advantages combine to make tricycling healthful alike to body and mind. Nor is it injurious even to delicate persons if proper precautions are observed. It benefits many chronic complaints, and, according to eminent authorities, may be practised with advantage even by ladies who are far advanced in pregnancy, during which period many are apt to be too sedentary.

For those who have a tendency to grow unduly fat, especially in middle life, the tricycle is invaluable. Many people who "live well" are apt to suffer from indigestion really induced from over-eating, and these are greatly benefited by tricycling. The reason for this is simple. As previously explained, in exercise muscular work is done and tissue used up, hence room is left for new material, and food is properly utilized. Tricycling, like other exercises, should not be undertaken within an hour before or after eating, and this for a simple physiological reason. I have said whatever part of the body is in action receives an extra supply of blood to replace the waste of tissue that is going on. Hence when the stomach is engaged in the work of digesting a meal it requires a continuous and liberal allowance of the vital fluid; but muscular or severe mental exertion draws the blood from the internal organs to the muscles or brain, *ergo*, rest should be indulged in both before, after, and during meals.

Tricycling has become quite fashionable for men, and there is every reason to hope and believe

that it will soon become so for women, for whom, as I have shown, it is a particularly suitable means of exercise, if only a sufficient number of ladies living in towns will cast off the fear of being stared at, and bravely mount the iron steed in public. Ladies in the country already largely patronize the tricycle. The ladies of the Royal Family have set a good example to the women of England in this matter. The Princess Mary, Duchess of Teck, took the initiative; then the Queen presented two machines to her young grand-daughters, the Princesses of Hesse; the Princess of Wales next gave her eldest daughter one for a birthday present; and the Princess Louise rides one herself. I believe that in Manchester it is quite the usual thing for a lady to do her marketing on a tricycle, or to use one when making a round of visits, and I cannot see why the same thing should not be done in London and other great towns.

Besides the healthfulness of the exercise, women of business would find a great deal of time saved in travelling distances which in London are so great, and which a tricycle can cover much more pleasantly than an omnibus or the underground railway, which last can certainly not be recommended for its health-giving qualities. Moreover, one has very often to go to places not reachable by the routes of the public conveyances.

To ladies who are not accustomed to go out alone the Sociable should prove a great boon. I have often seen husbands and wives bowling along

on these double machines, and noticed how happy and comfortable they looked. The same sort of machine would be delightful for two ladies, and has this advantage over the single tricycle, that the riders can work it alternately, so that neither need become overtired, even on a long journey.

The other day I saw a tricycle made to work, not with the legs, but with the arms. It occurred to me that great advantage might accrue from machines being made to work either with the legs or arms, so that when the legs become fatigued, the arms, and with them the muscles of the chest, might be exercised—an end devoutly to be wished.

Tricycles are suitable for people in all stations of society. For those whom business takes very much into the streets they are desirable as a means of saving both labour and time, and for those whose occupations are sedentary they are a means of obtaining healthy exercise and fresh air.

On the dress of ladies the tricycle is likely also to have a salutary effect, for to ride it comfortably the dress must be light and easy in every part. Heavy skirts hanging from the waist would inevitably produce backache, and tight stays would be too painful to be borne.

Neat, dark cloth costumes, ulsters or jackets, with small felt or cloth hats to match, are suitable for tricycle wear, or dresses of those brownish materials which do not show the dust of the road. Until tricycle-riding has become more common for ladies in great towns, they would hardly care to go about in such bright and attractive costumes as one

uses for carriage wear, as by so doing they would obtain more notice from passers-by than would be altogether agreeable. It is, however, not at all necessary to go to the expense of having special dresses for tricycling, though, of course, these may be had if one likes.

In the Dress Department of the International Health Exhibition were several dresses adapted for tricycle wear. Of special dresses which would be exceedingly comfortable and suitable I noticed one or two, but these could hardly be worn in towns unless the wearers were hardened to a considerable amount of staring and of comment from the younger and dirtier portion of the community as they passed along the streets. One of these dresses was intended for the Highlands, or for mountaineering purposes. It was made of a dark blue cloth, with gaiters, knickerbockers, a skirt reaching to the knees, and a very pretty short coat like a gentleman's shooting-jacket; the hat was made to match. This is a fair type of the kind of dress to which I am now referring, and of which other specimens were exhibited differing in unimportant detail.

This sort of dress saves the wearer from the friction and weight of long skirts, which form an impediment, and are the means of wasting a considerable amount of energy, whether in walking or propelling a machine, and for the same reason all sorts of divided skirts are suitable.

The dress worn by the members of the Ladies' Cyclist Touring Club is made of dark grey tweed,

and consists of a Norfolk jacket, a long skirt covering knickerbockers, and a hat to match. This costume is made by my own tailor, Mr. T. W. Goodman, of 47, Albemarle Street, W., who is tailor to the club, and I believe the only person who has given much attention to the subject of cycling dress for ladies. Mr. Goodman has also invented no less than three different costumes intended to serve both for tricycling and walking, or travelling dresses, as it is inconvenient to have a dress which can only be worn on the tricycle. The first of these dresses obtained a medal at the Health Exhibition, and two medals at the National Health Society's Exhibition held the year before; the others would doubtless have been similarly distinguished had they been invented at the time.

The first of these dresses, Fig. 21, is a dark blue cloth Princess robe, with the ordinary drapery at the back and a scarf round the hips; at the right side of the skirt are some bows of ribbon, and these, when the wearer is walking, hide the secret of the dress. When she mounts her iron steed, all she has to do is to unfasten some buttons which are cunningly concealed beneath the bows, and at once she has a skirt perfectly adapted for tricycle-riding. It is constructed on the same principle as the riding-habit now worn, with room for the raised knee, so that the skirt does not draw up with the movements necessary to propel the machine. The part which is buttoned over is cut with a deep curve, so that when buttoned, the bows, which are seen on the right side of the accompanying en-

graving, are in the centre of the skirt. The part that was folded over gives extra width to it, and the curve which is now in the middle accommodates the knee as it rises. This, I think, must be easier to make, and more convenient, than the modification of dress suggested by Mrs. Fenwick Miller. But her suggestion is highly practical and not at all difficult to carry out; it is that a kind of false flounce should be put "upon the front and side breadths of an ordinary walking-dress, so that it can be buttoned up when walking, and let down to conceal the feet when tricycling." Both in this modification and that invented by Mr. Goodman, I should think that small hooks and loops would be preferable to buttons in fastening, as they would show much less when undone. This dress can also be made with a jacket body.

Fig. 21.

The other costumes which serve the same purpose, are to my mind prettier and more artistically constructed than the first. In Fig. 22 there is a smart jacket body, the skirt being plain with a number of pleats inserted as a deep kilting in the front, partially concealed by a pointed apron. The pleats provide accommodation for the knee when it rises in working the machine, and they are utilized in the same way in the costume represented by Fig. 23. This dress is more like an ulster than a costume. The upper part of it is made like a Norfolk jacket to which a plain skirt is attached; a deep kilting is inserted the whole length of the skirt in front. There is something very *chic* about this dress, and it is suitable for rather cold or wet weather, when it may be used as a winter mantle, or to take the place of that valuable but ugly contrivance—the waterproof. Although so different in appearance, these dresses are all made with the same design, that of providing comfortable and healthy costumes for lady riders. This design has been excellently well carried out, and although in the pictures the bodies are represented as being rather confined in the waist, this fault is not to be found in the originals. Tight-lacing must be banished from the mind and body of the woman who would ride the iron steed; but since dresses for tricycling should be becoming as well as healthy and comfortable, although room must be allowed to give perfect freedom to every movement, a really accurate fit, such as can only be given by a good tailor or maker, is required.

Like the riding-habits mentioned on p. 215, these dresses are lined with flannel, and the ideal way of wearing them is with woollen combinations next the skin, a flannel body fitting closely to the figure to take the place of stays, and buttoned on to this a pair of knickbockers or trousers of cloth to match the dress. Of course, these unmentionables do not show; but a lady clothed in this way is better able to face the risks of accident than one in petticoats, which are liable to hamper her movements.

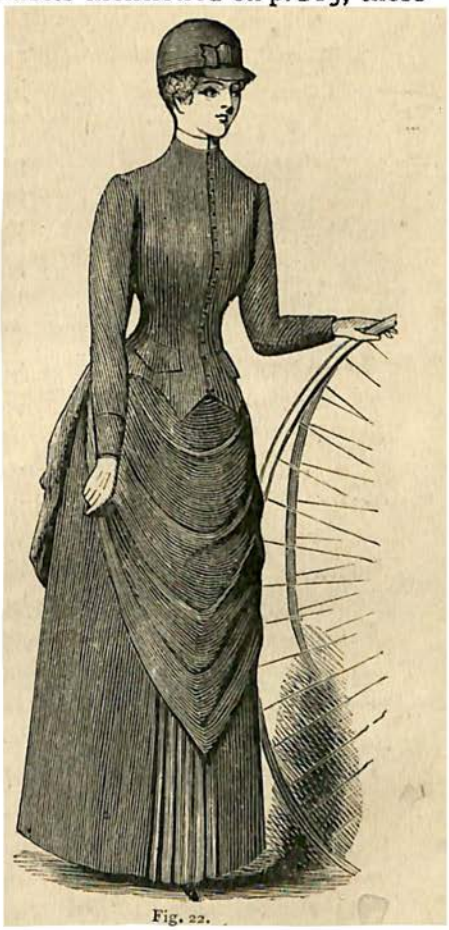


Fig. 22.

Moreover, this method of clothing gives a sense of lightness and freedom which can never be enjoyed by one dressed in the ordinary way. I venture to suggest myself that a sort of apron could very

easily be made, with an accommodation for the knee in the middle, as in Mr. Goodman's invention.

Fig. 23.

This could be put on when the lady mounts and instantly thrown off when she dismounts. For instance, if she were going to pay a visit or do some shopping, she could wear any dress she chose; she would at starting put on the apron, which would protect the dress from dust and mud, and while going into the house or shop she would simply leave it outside on her tricycle, to which it might be fastened.

To hats for tricycling the same observations apply as to those for other purposes. The hats shown in Figs. 22 and 23 are made by Mrs. White to match the costumes by agreement with Mr. Goodman, and the soft felt hats shown in Figs. 19

and 20 are suitable for tricycling as well as for riding, walking tours, and travelling, for the last two of which purposes the dresses I have described are also admirably suited.

Boots or shoes for tricycling should be made to fit the shape of the foot, so as to be perfectly comfortable, not according to the present absurd fashion, which, instead of allowing that movement in the toes which should take place in walking, cramps them together into a mangled and deformed mass. The chief points to be observed in getting boots or shoes are that the toes should be broad, to allow full play to the toes of the foot; the heels, if any are worn, should be low and broad, and under the natural heel, instead of being a sort of peg pushed forward right into the middle of the foot, like the fashionable Wurtemburg heels. The waist of the boot, answering to the arch of the foot, should be, to a certain extent, elastic; and the boot, though it should not press in the slightest upon any part of the foot, should not be too large, or it will chafe both stocking and skin. On this subject, however, I need say no more here as the next chapter will be entirely devoted to it.

With proper care, and such protections against cold and wet as I have mentioned, tricycling may be rendered both possible and profitable in almost all weathers; and I hope that lady tricyclists will soon be as plentiful in our streets as they are now rare—at any rate, in London.

CHAPTER XIV.

THE FEET AND HOW TO CLOTHE THEM.

THE subject of clothing for the feet is one of very great importance, both directly and indirectly, as affecting the comfort and health of the individual and the well-being of the nation. Ill-formed boots and shoes are not only the cause of direct suffering to the wearer, but they also indirectly lead to the impairment of his or her health by rendering exercise painful, and thus hindering the development of the muscular system and robbing the lungs and the blood of the fresh air so needful to their proper action. For, as owing to want of out-door exercise the lungs are badly supplied with air, the circulation becomes sluggish, the blood is insufficiently supplied with oxygen and the processes of nutrition are impaired.

It is said by competent authorities that a potent cause of anæmia, a disease characterized by pallor owing to a deficiency of red corpuscles in the blood, among Chinese women is the cramped state of their feet, which prevents them from taking proper

exercise, and the reason of this will be apparent after reading the next few pages.

Anæmia is a very prevalent disease among English ladies also, and the same cause is probably in action here to a considerable extent. It is only natural that when progression is so painful, as I know it to be in fashionable boots or shoes, people should prefer to remain at home in an easy chair or on a sofa, or at best to be driven out rather than walk even a short way. They do not, perhaps, recognize the reason of their disinclination for exercise, but think that it is natural for walking to be so very tiresome. It is time, however, that there should no longer be any mistake on that point. More than half the troubles of life are produced by the sufferers for themselves, and the troubles caused by improper boots are some of these.

The neglect which has been the fate of our "poor feet" is one of the most extraordinary facts in civilization. The evils of improper foot-coverings have been pointed out again and again, but for centuries past little advance has been made in this respect. The ancients were by no means free from troubles produced by ill-made shoes and sandals; and, indeed, Socrates, like a true philosopher as he was, preferred to go barefoot rather than wear the fashionable foot-dress of his time, the diseases and deformities produced by which have been described by Celsus and others.

Changes of fashion as regards boots and shoes have been many, but the changes have been almost

invariably from one evil to another. At one time the toes have had such long and narrow points that they were turned far up and fastened by a chain to the knee, while at another they have been perfectly square; at one time the heels have been half a foot high, at another they have been quite flat. Francis I. of France was a free liver, and suffered much from swollen feet; he, therefore, introduced preternaturally wide toes, and this fashion spread so quickly over Europe that in the sixteenth century a law was passed in England prohibiting the wearing of boots more than six inches wide across the toes. Unnatural width in the toes of boots is, however, a less evil than the unnatural narrowness of the toe which has been the prevailing fashion for generations, and is still unfortunately so common that it is almost an impossibility to obtain a boot or shoe ready-made which is less than two inches narrower across the toe than the foot that has to be crammed into it.

The result of the high-heeled and pointed shoes, which curl the toes up into a painful mass and render the centre of gravity unstable, is to impede locomotion and make exercise repugnant. In this result they resemble that of the *cioppini*, on which the ladies of the sixteenth century and later were apt to hobble about, and which, according to Cobarruvias, were intended to prevent women from gadding. They were made first of wood and afterwards of cork, forming a clump under the shoe which was sometimes a foot and a half high, and highly orna-

mented. Ladies walking out in them were obliged to lean on the arm of an attendant, or they would have fallen to the ground.

Thus were European ladies brought much to the same condition as that of Chinese female aristocrats, whose feet have been reduced to the much-desired shape of "golden lilies." The Chinese process is instructive, as showing to what tortures people will consent for the sake of fashion.

As soon as the child has learned to walk the feet are bandaged with strips of specially-made material, the strips being two yards long for the first year and five yards long afterwards. The toes are bandaged closely under the foot, and the arch of the foot increased by this pressure. The bandage is worn night and day for a month, after which the feet are soaked in hot water, the bandage removed, with a considerable quantity of skin adhering to it, and the joints kneaded to make them more pliable. The feet are then re-bandaged more tightly than before.

This process is repeated at intervals, and sometimes one or more toes will come away when the bandage is unwound, having mortified under the pressure. For the first year the pain is excruciating, and occasionally girls cannot be made to submit to the prolonged torture, and their feet remain imperfectly doubled together; in these cases a piece of cork is placed in the space between the front and back of the foot, so as to support the weight of the body. When the process is continued, in about two years the nerves of the parts implicated in the

bandages have become deadened, and pain ceases, the muscles below the knee have shrunk for want of use, and the feet, the front parts of which have been completely destroyed or doubled under, are reduced to mere stumps, on which locomotion is about as easy as it would be if the legs from the knees downwards were made of wood.

Any one reading this description will of course exclaim, "O how shocking! Thank goodness we have nothing like that in civilized Europe." The exclamation is perhaps natural, for we are all rather given to seeing the mote in our neighbour's eye, but not the beam in our own; but in the matter of its feet, civilized Europe has much reason for complaint.

The persistence of the pointed toe, which has been fashionable for many centuries past, is indeed one of the most remarkable examples of the survival of the unfittest which can be found. It is made upon a last shaped in front like a wedge, so that the side of the boot or shoe which should accommodate the big toe is precisely similar to that which covers the little toe. Now, if the wearers of these boots were in reality what dress-reformers may euphemistically feel inclined to call them, this arrangement would not be at all amiss, for it is admirably suited to clothe a foot which has a great toe in the middle and a little toe each side of it, like that of a goose; but that the human foot, constructed as it is, can be crammed into a receptacle so much smaller than itself and of so different a

shape as the fashionable boot or shoe, is a standing marvel.[1]

In reality, the great toe is pressed into the middle of the boot, where it overlies the second and sometimes part of the third toe, while the tip of the great toe, which is an inch or more in thickness, is forced into the small space whence the wedge end of the last has been removed. Nor is the case much better even if the shoe is worn a size or more larger than the foot; for, however this may be, in walking the high heel forces the toes down into the wedge.

And what is the beauty of the result when all the tortures of these "infernal machines" are endured? The appearance is that which suggested to a little four-year-old who had been comparing his own chubby feet with those of a gentleman visiting his father, who wore shoes tapering to a point in the approved fashionable style, the following question: "'I say, is your toes all cutted off but one?"

Can English gentlemen condemn Chinese ladies for deforming their feet in the way I have described when in the appearance of their own they come so very near a similar ideal deformity? What would be the horror of an English lady whose child was born with only one toe on each foot, and that in the middle? Yet this is the form to attain which both men and women have been suffering tortures

[1] See Plate 7, which is by no means an exaggerated example of the cramming process.

for generations past; for, although invariably women are made to bear all the blame which is given in respect to articles of dress, in the matter of pointed toes the men outdo us entirely in their extravagant outrages on nature.

Even intelligent men have not the slightest idea of what the natural shape of the foot is; and a clever young fellow, who, by-the-bye, had on a pair of patent leathers in the extreme of the pointed fashion, on my condemning this fashion, endeavoured to convince me that I was in the wrong in the following way: "Now, look at my hand," he said, spreading it flat on the table, with the fingers lying close to each other. "You see that the fingers on each side slope up to a point constituted by the middle finger. Well, the foot is exactly like the hand; so you see the fashionable boot is a natural and proper shape."

Nor, indeed, is it very surprising that people should be so ignorant as to what is the proper shape of the foot, for such a thing as a natural foot is hardly to be found except among the street boys in our gutters, from whose lower extremities the fashionable world avert their gaze. Not even the feet that we see represented in pictures or by sculptors are natural feet, for, although to a certain extent idealized by the artists, they really represent models which have been cramped by ordinary ill-fitting boots, and I have seen even in books of anatomy illustrations of so-called normal feet where the great toe was directed outwards, evidently by the fault of

the bootmaker who shod the original of the picture.

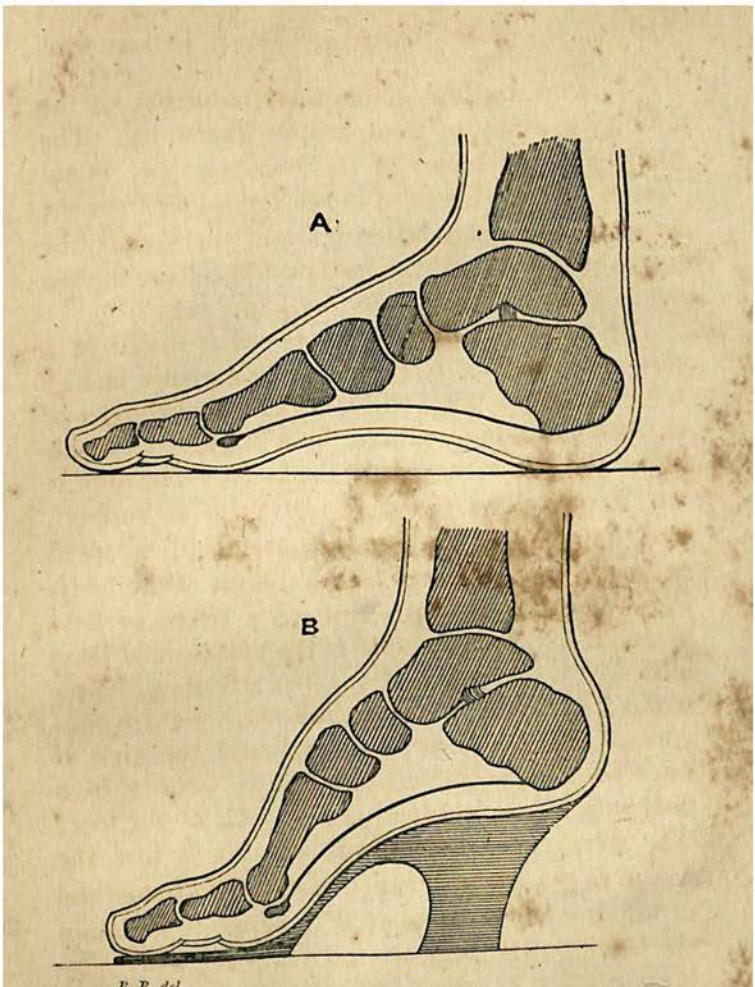
Deformed feet are unfortunately not the exception but the rule in England, and it is quite time that we should strike at the root of this evil. The foot is naturally a beautiful organ; why should it not be allowed to retain its beauty? The foot is generally said to have three chief parts—the tarsus and metatarsus, which form the arch of the foot, and the toes. These parts are made up in all of twenty-eight bones, all of which are well supplied with muscles. The foot is therefore by nature a very mobile organ, and those who have been deprived of the use of their arms have found that with their feet they could perform those actions for which we employ our hands. There is a well-known case of a man born without arms who earned his living by painting pictures with his feet, and another in the same unfortunate case who became a very good violinist.

If we watch the movements of infants' feet, we notice their great freedom; the little toes are stretched out and drawn back, they will grasp anything placed in contact with them, and the bones and muscles are all brought into play in seemingly aimless sprawlings. These movements, however, are by no means aimless, they serve the good purpose of preparing the feet for future usefulness; but that usefulness is unfortunately curtailed by our "civilized" boots and shoes, which cramp the feet, and, by preventing the proper movement of the bones, cause the degeneration of

the muscles and the consequent reduction of the foot to a state of comparative inactivity. The phalanges, or bones of the toes, and the metatarsals, or long bones of the instep, suffer from the narrowness of their coverings, and the tarsals, the bones at the back of the instep and heel, are thrown out of their proper position by high heels.

The natural position of the bones is shown in a side view in Plate 6, Fig. A, while a glance at Fig. B in the same plate will convince the beholder of the bad position produced by a high heel, which alters the whole balance of the body. The arch is well known to be the strongest form of support, and the arches of the feet are consequently adapted to be the best supports for the weight of the body. An arch has level abutments and a centre or keystone, which is represented in the foot by that bone with which the bones of the leg articulate. Now if the abutments of an arch are not level the position of the keystone is altered and the arch at once becomes unstable. Thus it is when a high heel raises one abutment of the arch of the foot.[2] The strength of the natural support is lost, the centre of gravity is changed, and the whole method of walking has to be altered in order to maintain the equilibrium. Hence people who wear very high heels take small, mincing steps, are apt to totter and stumble in their walk, and are on the whole most ungraceful in their movements. This is one of the chief reasons why we see so few people who really walk well, for the boots of the

[2] See Plate 6.



B. R. del.

Plate 6.—The bones of the foot at rest. (A) Normal position. (B) Distorted position caused by high heel.

To face p. 236.

majority will not allow them to do so. For my own part I think that grace of bearing, comfort, and health are preferable to fashion in boots; but I must warn those who very rightly make up their minds to take this view of the question, and make the change from irrational to rational foot-gear, that they must not be discouraged if they feel some discomfort at first in consequence of the change.

When the position of the bones is altered as I have shown it to be by high heels, the action of the tendons and muscles in connection with these bones is also changed, so that those accustomed to wear high heels feel discomfort and sometimes even severe pain if they have to walk barefoot or with low heels; for the muscles connected with the sole which form the Achilles tendon suffer under the unaccustomed stretching. The discomfort, however, will rapidly disappear if rational foot-gear is worn for a time, as the muscles will regain their natural and proper action. Raising the heels diminishes the leverage by which the balance of the body is maintained, and the higher the heels the greater is the risk of falls and sprains, and the greater the distortion of the foot.

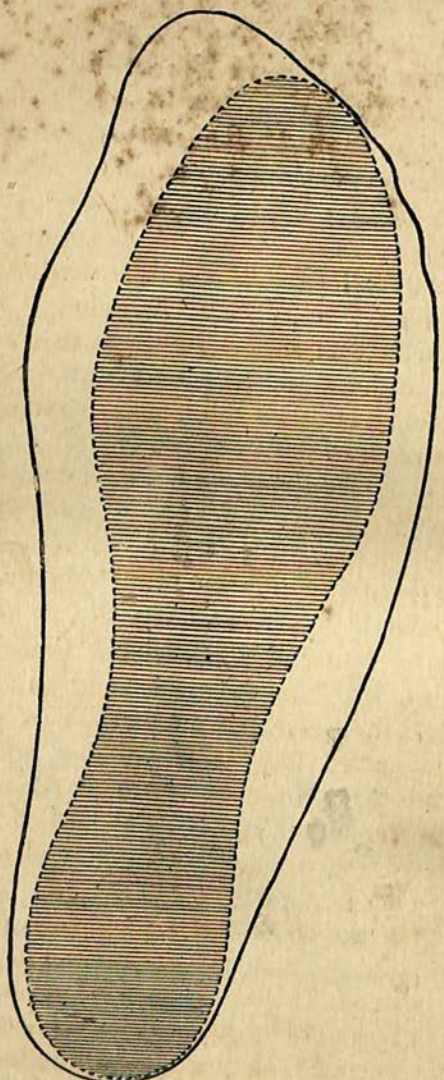
In natural walking the heel first touches the ground, and although it has even quite recently been maintained by Mr. Ellis[3] and others that the toes are first to come in contact with the ground, the truth of the reverse is conclusively proved by photography. In instantaneous views where foot passengers are, so to speak, arrested in the various

[3] *Lancet*, June 21st, 1884.

stages of the series of movements which constitute a step, the leg is seen to be extended stiffly from the hip, the toes pointing upwards at almost a right angle to the heel, the back of which rests on the ground; at the next stage the toes reach the ground, and if they are permitted to act properly, the great toe will be held firmly throughout its length on to the ground and form a firm basis of support for the weight of the body, while the small toes will grasp the ground, and the heel be lifted at the same time as the heel of the other foot is being advanced for the first movement of the next step. The various movements in walking follow each other so rapidly that we are quite unacquainted with them, hence when they are photographed they appear unnatural and even ridiculous.

Since the heels reach the ground first, they wear from the back, and hence it is desirable that the leather should be thicker at this part than at any other. To this real want may be attributed the use of heels which has developed into such an abuse; but although there is a real use for heels they should be used in moderation, being low, not much more than twice the thickness of the sole; they should be broad, and they should be placed so as to support the centre of gravity of the body. If placed too far forward or too far back the difficulty of walking and the fatigue of standing is greatly increased.

When the heels are high the body has to be bent forward as in the once familiar "Grecian bend," and this frequently leads to spinal curvature



B. R. del.

Plate 7.—The outline is that of an ordinary foot, while the shaded part shows the boot into which it is forced.

To face p. 239.

in girls who have not done growing, or who are weak in the spine. The pelvis (see Plate I, A) is also tilted forwards, and this leads to anti-flexion of the uterus, one form of displacement of the womb, as it is commonly called, with all its attendant evils. Towards the end of pregnancy also, when the upper part of the female frame is thrown back in order to maintain the centre of gravity, the heels are greatly borne upon in walking. At this time high heels are most dangerous, as they are not only likely to cause the wearer to fall forward, but they prepare for her a difficult labour by causing the lumbar vertebræ to push forward.

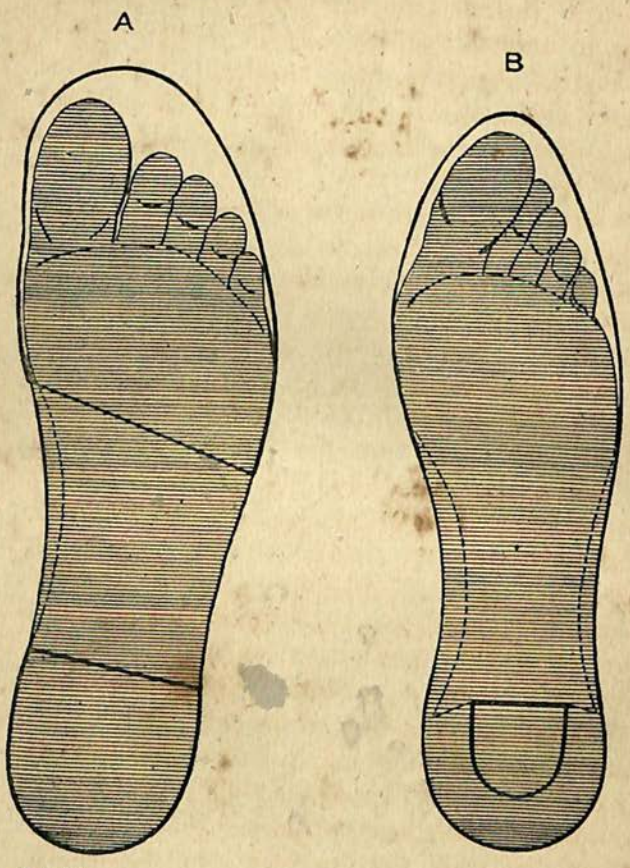
The high heel assists the pointed toe in deforming the foot by forcing the foot forward to the end of the boot.

A simple experiment will show any individual what the shape of his boots ought to be; for feet are as distinctive features of the human frame as hands or faces, and they ought to be studied accordingly. If the weight of the body is pressed forward on the naked foot as in walking, unless the foot has become thoroughly deformed, the toes will be seen to spread out, the great toe, which has only two joints, will spread somewhat inwards away from the others, and be firmly pressed upon the ground, while the other toes, which have three joints, will be slightly bent up at the middle, so that the soft cushions at their extremities exercise the grasping action before mentioned. The second toe is a trifle longer than the others, and naturally somewhat arched above them, exercising

an important grasping action. Unfortunately, however, it is generally thrust under the great toe and rendered useless by the agency of improper boots.

With such ill-made boots (see Plate 8, Fig. B) owing to the bones of the feet being prevented from exercising their proper movements in walking, the muscles below the knees, which are connected with those bones, waste for want of use. The foot, cramped into a motionless mass by the boot, thus becomes in its function, or rather want of function, very like the deformed "lily" of the Chinese, and the shrunken, calfless leg is in a similar way used simply as a stump. Since proper action in the lower part of the leg is thus prevented excessive work is thrown on the muscles of the thigh, &c., and exercise becomes painful and exhausting. Moreover, ill-formed shoes and boots are the cause of many painful affections of the feet, such as corns on the joints or between the toes, of the hard or soft variety, bunions or inflammations of the joints, ingrowing toe-nails, the extraction of which is one of the most painful operations known to surgery; inflammations of the roots of the nails (onchia), especially of the great toes, and painful callosities on all parts of the feet, besides the too common swellings and abrasions of the skin.

When, as in the narrow-toed boot I have described, the big toe is pressed outwards towards the centre of the foot, and the little toe inwards, as in Plate 8, Fig. B, which is only a moderate example



B. R del.

Plate 8.—(A) Normal foot in rationally made boot. (B) The same foot distorted by being forced into an ordinary fashionable boot.

To face p. 240.

of the fashion, the diagonal motion of the foot does not coincide with that of the boot, and the consequence of this is that the boot is trodden over either to one side or the other, a result which is aggravated when the heel is high. Roughness or other discomfort in one part of a boot will also cause the wearer to bear on the other side, and to "tread over the sole."

To return once more to the all-important subject of the great toe. When in natural walking it is drawn away from the others, the area of leverage by which the equilibrium of the body is maintained is increased. But when the toe is turned towards the middle of the foot, as in Plate 8, Fig. B, the abductor muscle, which, as its name says, draws the great toe away from the others, is stretched, the joint of the great toe with the metatarsal is enlarged, sometimes becoming inflamed, and the difficulty of walking steadily becomes great. To remedy this children naturally turn the feet themselves inwards, and thus a deformity very common in our orthopædic hospitals is created.

As Mr. Ellis has rightly said, "It is mainly due to the special development of the great toe, in a line with the long axis of the foot, that man is enabled to exercise the attribute of standing erect."[4] The conventional boot, however, seems purposely constructed to divert the great toe from its natural position; it aims at making the foot look as if both sides were symmetrical.

[4] See *Lancet*, June 21, 1884, pp. 1113—1115. Mr. Ellis M.R.C.S., "On Physiology of the Feet."

There is certainly a love of symmetry in the human mind; but art is not required to make the feet symmetrical. One foot is the complement of the other, and the two taken together, when placed side by side, make a sort of dome of which the two great toes, which should be parallel to one another, form the apex. The boots then should be made to the natural shape of the foot, and square toes, though not so objectionable from a health point of view, are equally bad, artistically speaking, as the pointed ones. Plenty of room should be given in the leather above the great toe, for, as Mr. Ellis remarks, "It is obvious that where a flexible material is fixed on both sides and left loose between, it can be drawn furthest from the surface to which it is attached in a line midway between the fixed parts. For this reason the highest part of the foot, which is in the inner side, will have a tendency to go to the middle line of the foot where most room can be made." The high ridge of the last, and consequently of the boot, should then be made on the inner margin, and if the line of the seam or laces of the boot be carried along this ridge the unpleasant effect of an inverted appearance of the foot, which a straight line would give in such a position, is avoided. Toe-caps should not be used as they give most room in the middle line. The great toe is so commonly and so easily diverted outwards that socks and stockings should be made with a straight inner line and otherwise to fit the foot. In considerable distortion a separate stall can be made for

the great toe both in the stocking and in the boot.

The chief points of importance that should be observed both by makers and by buyers of boots are that—

The inner margin should be straight to the big toe.

The toe should be of a natural breadth.

The heels should be broad, low, and under the natural heel.

The waist of the sole, answering to the arch of the foot, should possess a certain amount of elasticity.

Now, as we are unfortunately dependent on tradespeople, who for the most part are lamentably ignorant of even the first principles of physiology, for the supply of boots and shoes, there is much difficulty in obtaining those that are really fit to wear, and it was only after some search that I succeeded in finding a firm who were in the habit of producing healthy boots for adults, and would agree to make boots and shoes suitable for children on the principles I advocate, and under my direction in cases of difficulty.

After what I have said and am about to say concerning children, it will be evident that it is even more important for them than for adults that their feet should be properly clad, yet whenever I have spoken to a bootmaker on the subject, he has shown me certain abominations always kept in stock, and the type of which must be familiar to every one, and has said, "We very rarely make

boots for children; ladies prefer to buy them ready-made, and save expense."

This matter, however, is one in which money ought not to be saved at the expense of health and future suffering to the little ones. It will be a comfort, however, to those who are anxious to save expense to know that stockings and boots when made of good materials and to fit the shape of the foot, wear twice as long as those of ordinary manufacture. For the feet pressed on by ill-fitting boots or stockings struggle against the oppression, and in the endeavour to regain their natural shape wear through their coverings. This is the reason of the common experience that holes in stockings always commence over the big toe.

For adults, either male or female, the boots shown in Figs. 24 and 25 are to be highly recommended, and they are in accordance with all the principles of construction which I have laid down.[5]

These boots, called the "Hygeia" boots, were invented and registered a few years back by Messrs. Marshall and Burt, of 444, Oxford Street, W., and are far superior to any I have seen elsewhere. They should of course be made in most cases to fit the wearer, from proper measurements on lasts, which should be retained for future use, and from these lasts boot-trees should be constructed; but many people have feet which can be fitted from stock, and this saves expense. Boot-trees are a

[5] The proper position of the foot, as in these boots, may be seen in Plate 8, Fig. A.

great save to boots, as when not in wear the boots are kept in shape by them, and when the boots are cleaned they prevent the servant from soiling the insides.

I am glad to say that the above-mentioned well-known firm also supply children's boots and shoes

Fig. 24.

Fig. 25.

made on the principles here inculcated, and I trust that this will really tend to produce a healthier race of feet in the next generation; for although the evils of badly-shaped boots have long been known, it is very little use to know what is bad if you cannot obtain what is good, and hitherto the trade has been backward in supplying what is a real and urgent want.

On pp. 106, 107 I have made some observations on the construction of boots for young children, and the children's "Hygeia" boot, shown in Fig. 26, will be found a very useful one for boys or girls.

Fig. 26.

Continuing my remarks on p. 107, I may observe

that surgical boots do much towards the remedy of deformities in their early stages, but it is most imperative that such boots should be made by firms experienced in the work, and who will fit and contrive for each child what it requires.

Flat-foot, as that very common deformity, caused by the yielding of the plantar arch is generally called, usually occurs either when the child is put on its feet too young, or about the age of fourteen when growth is very rapid and muscular weakness is experienced. In these cases the arch should be supported by a properly-shaped pad fixed into the boot, and as the constitution becomes stronger the deformity will pass away, unless it has been too long neglected. Neither ricketty legs nor yielding plantar-arches are strengthened by tightly laced boots, and although ignorant bootmakers will frequently recommend them, they must be strictly avoided, for what the muscles of the foot and leg want is freedom of action, not compression, which will impair their development.

That very rare thing a well-formed foot in middle life is nearly straight on the inside from the heel to the tip of the big toe; but in infancy the great toe stands out from the others, giving a wider spread to the toes, so that the inside of the foot is concave. At this early period the various parts of the foot are soft and pliant, they are growing very rapidly, and are easily injured by pressure of any kind. Hence the shoemaker has to provide a proper width for the spread of the toes, and must also take into consideration the curve of the inside of the

foot, while allowing for the softness, elasticity, and mobility of the parts, and for the increasing size of the foot, both in length, breadth, and thickness. Yet this is just the time when the little one's feet are crammed into ready-made boots or shoes utterly unfitted for their requirements. Over-large stockings form into folds on the feet, and are very uncomfortable, while over-large boots chafe the stocking and the foot, and are liable to turn over in walking, causing stumbling and sometimes a sprain of the ankle. Throughout the whole period of growth stockings and boots should be worn as large as possible, without rucking or shuffling. They should be as light as possible, so as not to encumber the growing muscles, and the material of which they are made should be elastic. They must be given up when they begin to pinch the toes, and turn them from their normal position.

Both feet should be invariably carefully measured when fitted for boots, as very frequently, although no difference between them may be apparent to the eye, the respective measurements will be found to differ considerably. I have often heard it said by bootmakers that one foot is generally larger than the other.

Stockings, if in a minor degree than boots, are still to a great extent responsible for deformities of the toes.

The woollen shoe or sock for the baby is too often narrowed to a point at the toes, or at best rounded to the shape of a blunt wedge, so that the

tiny sprawling, out-spreading toes are not only cramped in the movements that are necessary for their healthy development, but are wedged together with the great and little toes approached to one another, and thus the foundation is laid for deformity, afterwards to be perfected by the narrow-toed boot of later life.

I have sometimes seen these little shoes or socks so short for the baby that its toes have been quite doubled up by them. In crocheting or knitting the babies' stockings such as I have described on pp. 67, 68, care must be taken to allow for the out-spread of the toes, the growth of the foot, and the shrinking which may take place when the little woollen garments are washed.

I may here observe that they should be washed in nearly cold water, stretched with the hands before being hung up to dry, and allowed to become as dry as possible before being finally aired by the fire. These remarks apply to all woollen clothes which have a tendency to shrink when washed, a tendency which the above plan will check as far as possible.

At a later stage, when shoes or boots are worn, and stockings are no longer as a rule made at home, there is greater difficulty in obtaining suitable foot-coverings.

All stockings ordinarily sold are rounded at the toes, and tend to divert the great toe from the straight line it should occupy. It is, however, of great importance that the stockings should be straight on the inner side, so as not to deform the great toes, and if such stockings cannot be

bought ready-made, they must be specially manufactured or knitted at home. If the demand for them becomes sufficiently general, the supply will soon follow. Failing these plans, however, ordinary stockings may be bought a couple of sizes too large for the one who is to wear them, and then cut to the proper shape and carefully sewn at the edge with darning wool.

It may perhaps be thought that it is sufficient safeguard to have the stockings over-large; but it is not so, for in putting on the boot or shoe the toes are forced down to the end of the stocking, and the loose part of the stocking at the heel only makes matters worse by pressing the foot forward into the boot.

There is much to be said in favour of stockings made with toes, as gloves are made with separate stalls for the fingers, and these are especially desirable when the toes have already been deformed by improper clothing, and in cases where the feet perspire offensively. In ordinary cases, however, it is quite sufficient if the stocking is straight on the inside and does not press the toes in any way. If the foot is placed on a piece of paper and the body supported upon it, the foot can be pencilled round and an outline obtained on the paper, which will serve as a guide for the shape of the stocking and of the boot. The outlines of both feet should be taken in the same way, so that both may be properly fitted.

Children are more liable to have ill-fitting boots than adults, because whereas adults, if they are

sensible, will, when trying on boots, exclaim when they feel painful pressure on any part of the foot, and insist on having something more comfortable, the child, whose new boots are a size larger than the old ones, finds relief in them, and only discovers their fault too late when the growing foot finds the uppers rigid and hard, and the toes are again compressed. By this means the process of deforming the foot is rendered gradual and less painful than might be supposed from the degree of harm done.

As yet I have said nothing about in-door shoes, although they are quite as important, if not more important, than out-door shoes and boots, since they are generally worn for a greater number of hours in the day. To get rationally-shaped house or dancing shoes I have found a literal impossibility, owing to the fact that showy and fashionable-looking shoes are made and imported at such low prices that few shoemakers will go to the expense of keeping a stock of properly-constructed articles. The harm done by those pointed-toed patent leather shoes which one can get so cheap is incalculable, and their effects are seen every day in hospital and private practice. An eminent surgeon, my friend Mr. R. Fitzroy Benham, tells me that when a student at one of the chief London hospitals he extracted very many ingrowing toe-nails, and a great number of these were cases of ladies'-maids and servants, who, either wearing their mistresses' cast-off shoes or aping the fashions of their betters, suffer extremely through having to be on their feet all day when

those feet are crammed into tight and ill-shaped coverings. To extract ingrowing toe-nails the patient is deeply anæsthetized owing to the extreme sensitiveness of the matrix of the nail, the nail is then seized with a forceps and literally dragged out by main force, leaving a sore and tender surface, which renders the foot useless for long after the operation. In private practice Mr. Benham tells me he never extracts the nail, but treats it by cutting the margins with a knife specially made for the purpose, and the application of lunar caustic; but as this line of treatment takes time it cannot be practised in hospitals, where the beds are always crowded with more serious cases.

This little description of one of the evils of ill-shaped shoes should prove a deterrent from using them, but if I were to describe all the harm they do I should have to devote a whole book to the subject.

In-door and dancing-shoes should be made on the same principles as out-door foot-gear, and they can be prettily trimmed or embroidered, as there is no reason that because they are comfortable they should be ugly, as may be seen from Fig. 27.

Fig. 27.

Very many girls suffer from cold feet, and this trouble is frequently traceable to wearing thin low-cut shoes or slippers in the house. It is very important, especially in the case of young girls, that the feet should be kept warm and dry. Hence thin shoes should not

be worn out of doors, and in-door shoes should not be cut too low. A very good plan is to wear old summer boots in-doors in the winter; but excellent house-shoes and boots may be made of cashmere lined with flannel.

Fig. 28.

For out-door wear in winter and cold climates boots may be lined with swan's down, and I have found this plan very good, as the feet are kept warm and chilblains prevented. The subjoined picture (Fig. 28) represents a very comfortable and pretty winter boot lined in this way and trimmed with fur. It can be made in all sizes for children as well as ladies, and when made for little boys or girls it can be buttoned higher up the leg than is shown in the illustration.

Before quitting this branch of my subject I feel that I ought to say something about corns, for this matter will, unfortunately, have a personal interest for most people.

When speaking of the skin and its functions (Chapter II.) I mentioned the cuticle, scarf-skin or outer skin (pp. 21, 22), which is given off in fine scales from the inner or sensitive layer, which it serves to protect. It is a beautiful example of the adaptability of Nature to adverse circumstances

that the cuticle becomes thickened when the true skin is subject to continued dangers. Thus the cuticle is thickest on the soles of the feet, which are always subject to pressure from the ground, similarly the cuticle of the hands of mechanics, and those who in their trades are obliged to handle rough, hot, or poisonous substances becomes thickened, and being itself insensitive and bloodless, protects the true skin, and enables it to continue its important functions unharmed. In a similar manner hard patches are formed by the thickening of the cuticle on the finger of the sempstress, and on the fingers of those who play on stringed instruments, and these patches coincide with the part which comes in contact with the needle or strings. These portions of thickened cuticle are in reality corns, and they are formed on the feet in order to protect the true skin from the pressure of an ill-made boot, or from any roughness on the inside.

This being so, it is evident that to talk of the "root" of a corn, and of extracting the same as chiropodists do, is pure quackery. The corn is really a natural protection, and to have it cut or dragged out is not only dangerous but useless, for if the cause continues it must grow again. The only way to get rid of corns is to wear properly-fitting boots, and then the corn no longer being required will go away of itself, the thickened layers of cuticle will separate from the skin. This separation may be assisted by soaking the feet in hot water, and after this the corn can be removed with the fingers.

Speaking of the skin of the feet leads me to the subject of the ventilation of boots, which is a very difficult one.

I have said (p. 24) that the perspiratory glands are more numerous on the soles of the feet than on any other part of the body, with the exception of the palms of the hands; hence in the clothing of these parts good facilities for evaporation and transpiration ought to be afforded; but to do this is well-nigh impossible, owing to the fact that it is necessary to protect the feet from injury by contact with stones, broken glass, tacks, and pins, &c. If we could go without boots or shoes entirely the skin of the feet would manufacture a protection for them in the same way as I have above described, by a process of thickening and hardening. As it is, however, boots and shoes are a necessary evil, and we must, therefore, try to make them as little of an evil as possible. Perhaps the most practicable way of allowing for the ventilation of out-door boots is to have merely a golosh of leather affixed to the sole, and the upper part of the boot entirely of cloth. Shoes, leaving the upper part of the foot exposed, of course afford better facilities for transpiration than boots made entirely of leather, and they may be worn in winter with cloth gaiters. For summer wear the uppers of the boots may be made of cashmere. Stockings should always be woollen, and boots and shoes should also be lined with woollen materials if practicable. When the feet are warm and damp from exercise, the stockings and boots should be changed, and even if the

stockings are not sufficiently damp with perspiration to render this necessary, it is always a good plan to change the boots or shoes on returning from a walk.

In the house, as I have said, woollen boots and shoes should always be worn, but the difficulty in wearing them out of doors is that they become saturated if the weather is wet. When the feet have thus become wet in bad weather the boots and shoes should be removed immediately on returning home, and the feet dried and rubbed well to promote circulation before dry coverings are put on them. As long as the circulation is kept up by walking, a chill is not likely to result from the feet being wet; but if we sit down to rest with wet feet, the consequences may be dangerous.

The plan of wearing very loose slippers in the house, a plan adopted by many men, is a very good one, especially in warm weather, as it leaves the feet free from pressure, and accessible to the outer air.

It may perhaps be thought that in proportion to the space devoted to other subjects I have given too long consideration to the clothing of the feet; but the matter is one of so great importance that I could have wished to say more about it, for I believe that if people only knew how much harm they are doing to themselves and their children by their general treatment of the feet they would at once adopt more rational principles. On all those who lament that painful feet, disinclination for exercise, and other affections such as I have

described in earlier parts of this volume are some of the "ills that flesh is heir to," I would fain impress the advice of Milton :—

> Accuse not Nature, she hath done her part ;
> Do thou but thine.

CHAPTER XV.

CONCLUSION.

IN the preceding pages it has been my endeavour not so much to lay down hard-and-fast rules for observance in the matter of dress, as to explain the reason why certain principles are beneficial while others are harmful. By teaching the physiology of the subject it has been my desire to lead women to think for themselves, and until they do so no permanently good results can be obtained.

It is a favourite saying on the part of men, that "women do not know how to reason," and in a certain sense this is true; not, however, because women are devoid of the faculty of reasoning, but simply because they are too lazy to use those faculties with which Nature has endowed them.

Of course it is easier to ask advice and to follow it blindly than to think out a course of action for oneself; but it is not only degrading, but dangerous to do so; and although advice may with advantage be frequently sought from those wiser and more experienced than ourselves, it should always be carefully weighed and considered before it is accepted.

It is time that women should think for themselves, not in opposition to their male relations, but in order to be able to be true helpmeets to them, and not mere dolls to be looked at, admired, and petted, but not consulted in difficulty or trouble.

I cannot now discuss this question at any length, but it is of great importance in regard to the present subject, for the dictates of reason are never more neglected than in matters concerning dress.

In the choice of dress women are content for themselves and their children either to imitate others, or to follow the suggestions of their tradespeople. This is a hindrance to all progress towards a rational system of clothing, as will be seen presently.

The spirit of imitation which we find so largely developed among those at the top of the scale of the lower animals, as for instance among the apes, is characteristic of a certain phase of human mind; we find it at the highest in childhood, while it diminishes with the growth of intellect, and in accordance with this fact we find it very highly developed among idiots and comparatively uncivilized nations.[1] In manners, customs, and dress, however, the so-called civilized nations of Europe are in the matter of "apishness" no further advanced than the most uncultured savage. Imitation is the great principle which governs Fashion, and Reason in these matters plays but a very minor part.

[1] For a fuller explanation of the subject, see my articles on Thought and Language, published in *Knowledge* during 1885. Articles xvi and xvii.

No fashion has ever been so inconvenient, uncomfortable, and injurious as to prevent its being adopted if initiated by high authority. Reason may influence the leader of fashion, but imitation does the rest. For example, the ruff was first worn by Queen Elizabeth to hide an ugly wen on her neck. The Court, from policy or politeness, adopted the new invention, and the commonalty, after the manner of nations, aped the costume of its social superiors.

The custom may originate in the express or tacit command of the ruler, or from mere imitation, but the result is the same. Henry VIII. introduced the fashion of wearing patches, by using round disks of plaster to conceal the repulsive appearance of his skin, and when a French queen's hair showed signs of turning grey all the ladies in France felt obliged to grease and powder their tresses. This custom soon spread widely in Europe, and with very unpleasant results, for, as hair-dressing was thus rendered a long and troublesome process, it was found inconvenient to go through the ceremony more than once in a week or ten days, and insect-powder soon became a necessary adjunct to the toilet. Coming to more recent times we may inquire into the origin of the "masher collar" of the present day, but we have to go some way back to seek it.

The neck of "the finest gentleman in Europe" was extensively seamed with scars of old abscesses, and, like "the maiden queen," he sought to conceal this deformity, and used a neck-cloth swathed

about his royal throat. By wearing a similar covering Beau Brummel earned the gratitude and confidence of his sovereign, for the Beau knew how to give a certain style to any garment, however hideous, and the gentlemen of England, succumbing to his charms, adopted the fashion *en masse*.

In the army upright collars were introduced, the height of which may be gauged by the fact that they were decorated with four rows of gold lace an inch and a quarter deep. They were as stiff as many thicknesses of buckram could make them; but even more than this, for the collars worn by soldiers included a stock of hard sole-leather, *five inches in height*. Imagine the discomfort of wearing one's neck constantly screwed up in such a vice! No wonder that fainting, heat-stroke, and apoplexy should have been common in the army under these conditions. George IV. died in 1830; but his military collar and stock survived him for a quarter of a century.

During the early years of Queen Victoria elderly gentlemen wore high starched cambric neck-cloths. But later on a more rational neck-dress came into use among the younger members of society in the Byronic collar, which, as the name indicates, was one of the forms in which imitation of the fashionable poet was exhibited.

The "masher" collar, which may be looked upon as, to a certain extent, a revival of the fashion popularized by Beau Brummel, has been brought into wear, like many other revivals of the styles of past generations, by means of a power of which

it is necessary to take account, and which I will call "TRADE INFLUENCE."

In the making of fashions there are several forces at work. Of these the most important is that to which I have previously referred—Imitation. There is also what I may call Conservation—that is, a certain respect for precedent, and a desire to retain what has become habitual, a force which acts as a check upon the others, and which being, for example, most developed in England, restrains English people from adopting any new style or custom for many months after it has become general in France, and even in America. And lastly, there is Trade Influence, which invariably makes itself felt, and depends for its success on the first principle—imitation.

It is to the advantage of that large section of the people who make their livelihood by supplying the rest of the world with clothes, that fashions should change quickly, so that new clothes may be bought before the old have been worn out, because the latter have become *outré*. On the part of some people there is a constant demand for novelty; they do not like to wear things, imitations of which have been obtained by "Jack, Tom, and Harry," or "Mary, Jane, and Eliza." Consequently the tradesman's brain is busy to devise the novelties which are in demand. Failing this demand he will devise a novelty all the same, and, carefully introducing it to a select few, he knows that by imitation a large demand for it will soon be created. Now, to devise a real novelty is something which

requires positive genius, and as this commodity is rare, the majority of the new fashions which are constantly appearing are, in reality, only modifications of bygone styles. Thus it is with the well-known "masher" collar, hat, and stick, with the dancing-pump and Queen Anne shoe, with the crinolette and padded shoulders and hips. A prediction has been made to me by the head of a fashionable firm that crinolines will be all the rage during the season of 1886, and, although it is devoutly to be wished that this will not be the case, it is highly probable that the prediction will be fulfilled, for the style of 1885 has led up to it, and trade influence can accomplish the rest. As the American said, "It is never safe to prophesy unless you know," and the prophet in this case had made up his mind to make a large sale of the article in question. The Quaker's advice to his son, "Make money, my boy! Honestly, if you can; *but make money!*" requires no repetition to men of this stamp, for they have long followed it implicitly. It is wonderful how people will submit to be humbugged in the sacred name of Fashion.

Until the end of the eighteenth century men and women were equally and foolishly extravagant in dress. Thus we find an imaginary correspondent of Addison's writing: "The skirts of your fashionable coats form as large a circumference as our petticoats; as these are set out with whalebone, so are those with wire to increase and sustain the bunch of folds that hangs down on each side."

The hoop and crinoline served to keep the weight of dresses off the waist of the wearer and to prevent its clinging round her legs in walking. If they are reintroduced, this argument will be advanced in their favour; for, as Mrs. Oliphant has remarked, "Until we can find some means of lightening the draperies of the female toilette or distributing their weight better, it is always possible that it (the crinoline) may appear again." I have in Chapter X. described a means of lightening and distributing the weight of women's clothes, and that it is quite time that, in the interests of health and reason, some such means should be adopted is proved by the following quotation, which shows to what ridiculous extremes fashion is at the present day tending:—

"The crinoline discussion (says the *Daily Telegraph*) crops up so often that one is tempted to say let's have the hoop and farthingale back again and have done with it! The question now is, are women going to content themselves with the dress improver as it has been worn for some time past, or is the feminine figure to be "improved" at the sides as well? Small waists are in high favour—never more so. Bodices are worn open, or frilled in front that breadth may be given to the shoulders; and, for the same reason, slight women sometimes have a roll of horsehair placed beneath their skirt on either hip. This same roll has elicited an indignant protest from some who are sternly opposed to the encroachments of crinoline, and who fear a return to the obnoxious substrata of former times.

It is very possible, however, that it may mean nothing or very little, and the Charlotte Corday dress requires a certain amount of support at the sides, real or artificial. Strangely soon do we accustom ourselves to new forms. In a few weeks all the peculiarity of this special gown seems to have worn off. When Sargent first showed his portrait of Madame Barckhard at the Salon, the black dress full on the hips, and without upper draperies, had the effect of a fancy costume. Seeing it again at the Rue de Sèze, it struck me quite differently. So attired, a lady might this season pass unnoted anywhere. This is the ebb and flow of fashion. It is now high tide with these relatively simple gowns, gathered or pleated, open in front or at the side, and made in soft falling woollens, in rustling taffetas, in rich watered silk, or flowered brocade; but the ebb will come very soon."[2] Instead of asking whether women will content themselves with the present fashion, however, the writer should inquire whether the shopkeepers will do so, which is more to the point. Weighty draperies and rich and heavy materials are brought into fashion by the influence of tradespeople for the sake of increasing their profits. If these wearisome and unhealthy modes of dress are adopted the crinoline will follow more as a palliative than as an evil; but it is the duty of those who have sense and knowledge to protest against such absurd and unhealthy extravagance. Just as the principle of atavism applies to the human race, so that in

[2] *Daily Telegraph*, June 9th, 1885.

reversion to an ancestral and inferior type a tailed boy is occasionally born, or an idiot possessing the characteristics of an ape, a sheep, or a goose, as in Pinel's cases, so it applies among other things to fashion in dress. For example, when we see, as quite recently, a revival of the maiden queen's high, stiff ruff, or of the first gentleman in Europe's stock, we see that which, although it once had a reason and a use, is now as objectless as the tail used by certain monkeys to swing from bough to bough would be to human beings who do not favour such a means of locomotion.

We of the present day who, as the latest outcome of social evolution, look back upon earlier stages with a sort of contempt should, nevertheless, endeavour to learn from the past whatever lessons it can teach, and they are many.

We should use our reason to discriminate between what was evil and what was good in the customs of bygone ages, and never forget that the cause which blinded the men and women of those times to evils which are patent to us, is still as active as ever, and prevents us, in our turn, from perceiving evils which will be patent to our successors when we shall be looked back to as ignorant old fogies. That cause is the vanity which, seemingly inherent in the human mind, makes each successive generation maintain that, "whatever I do, whatever I think, and whatever I say, must be right and proper." Hence the present always looks back upon the past with contempt, and forward to the future with doubt as to whether it will

not be degenerate. Yet in many respects we are "not better than our fathers," and this fact is illustrated when we look through old collections of prints or models showing the dresses of bygone times. Look at the simple, but elegant costume of the reign of Edward I., an ancient picture of which represents a figure clad in a plain under-dress and sleeves of brown, over which is a sleeveless polonaise of grey looped up on one side. True, the fashion is 600 years old, but I see no modern dress to excel or even equal it in its artistic beauty of simplicity or healthfulness of construction. There is a dress of the reign of Richard II., with a pretty tight-fitting jacket and long sleeves over a quite plain skirt, suited to any lady of the present day. Then, again, there is a charming housewife's dress from the reign of Henry VI. How deliciously neat it is with its grey and white materials; and how convenient that arrangement by which the outer sleeves button on just below the shoulder, so that they can be taken off when the wearer is at work; and what an amount of artistic skill is involved in the soft folds of the muslin round the neck, which, after being confined by the laced bodice, flow out from beneath it into an apron. That elegant dress worn by a young lady of the time of Henry VIII. is cut as a princess robe, with a longish skirt fulled into the bodice at the back, and trimmed with black velvet and folds of muslin over the neck and bosom. Models of all these were shown at the Health Exhibition.

Then the men's dress. I am sure all gentlemen

visitors to the Health or Inventions Exhibitions must have envied the costumes worn by the *employés* in Old London, whose clothes were so becoming, so comfortable, so infinitely more desirable in every way than the angularly-cut and sad-coloured garments of the present day, with their accompanying tortures of "masher collars," stiff cuffs, and silk hats.

Why is it then, it may well be asked, that bad old fashions are generally revived in preference to good ones? The answer is to be found in the fact that revivals are the work of trade influence, and that as it is to the interest of those concerned in trade that fashions should be as extravagant as possible, there is no probability that they would attempt to revive styles which are simple and owe their healthfulness to following the lines of nature.

Obstacles are placed in the way of every alteration, it is true; but again to quote the words of one of the greatest practical physiologists that has ever lived, "surely no question of mere (pecuniary) gain to any or to every class ought to be allowed to stand *for ever* in the way, when the lives and happiness of multitudes of our fellow-creatures and the tranquillity and real prosperity of the country are at stake. Unless we *begin* somewhere, how can any improvement ever be accomplished?"[3]

It must be obvious, from what I have already said, that the interests of the public and of the tradesmen engaged in supplying them with clothes by no means coincide, and therefore it behoves

[3] Combe's "Principles of Physiology," ed. 1835, p. 22.

every individual to do the best he or she can for himself or herself in this matter.[4]

I had long suspected this, but I was startlingly convinced of the truth of it when, while writing this book, I made it my business to visit most of the important suppliers of dress in London. Almost everywhere I was covertly met with the same principle, "The public will buy whatever we choose them to, so why should we put ourselves to trouble and expense in order that they may have good and healthy things?"

The moral of this is obvious; the public must no longer take things on trust, but must itself learn to discriminate between good and bad, and by rejecting the latter, force those who are, after all, dependent upon it, to supply what is really good. When tradespeople see that the public will no longer be imposed upon, a higher system of trade morality will of necessity be evolved.

Although each individual should modify his or her customs, both in other things and in dress, to suit the peculiarities of each individual case, there are certain broad principles which apply to all alike, and these cannot be more clearly stated than in the words of an old writer, who in the *Gentleman's Magazine* in the year 1738 laid down the following canons of beauty:—

[4] In reference to my remarks on pp. 190-1, I may here add that in *self-defence every lady* ought to know how to make a dress, and I can thoroughly recommend the Anglo-Parisian School of Dressmaking, Academy House, 295, Oxford Street, W., to those who wish to learn the art.

"1. Everything which alters or disguises nature proceeds from a false taste.

"2. Everything which forces nature beyond its due bounds proceeds from a bad taste.

"3. Everything which eclipses the beauties or exposes the defects of nature proceeds from want of taste.

"4. Everything that constrains nature or hinders the freedom of action proceeds from a depraved taste.

"5. Everything which loads nature with superfluous ornaments proceeds from an affectation of taste.

"6. And everything which is out of character is certainly out of taste; and though the fashion can never influence taste, yet taste should always influence the fashion."

If in regard to these canons we consider the observations quoted on pp. 263, 264 anent the fashions of the present day, the conclusion is obvious.

Rules 1 and 4 have a particular bearing on health, and the results of breaking them are at once apparent after reading what has been said in this volume on the subject of tight-lacing (Chapter X.), and of the ill-usage which our feet receive (Chapter XIV.); but to take another example, let us see what results from the method of dressing the hair, in which "nature is altered" by the hair being forced in an upward direction, instead of being allowed to follow its natural tendency downwards.

To the present fashion of dressing the hair on the top of the head the *Lancet*[5] attributes the prevalence and increasing frequency of neuralgic headache among women, and its remarks on this subject are worth noting and laying before the fair sex, into whose hands that paper rarely comes. It says, "The pain experienced is generally located in one or more of the branches of the second cervical nerve, very commonly those terminating in the scalp at the occiput. As a matter of fact the nerves of the scalp are irritated by the hair being drawn tightly back and put on the strain, not as a whole, in which case the strain would be spread over a large area of the surface, but by small bundles of hair which are pulled back and held in place by hair-pins. Relief is often consciously experienced as a result of removing the hair-pins, but this has only a temporary and partial effect. The injury done is lasting, if not permanent in its consequences."

In short, it is needless to multiply instances in support of the proposition which I have previously advanced to the effect that—Health and beauty go hand in hand, and indeed from the point of view of language they are intimately related, for our word *health*, connected with the other English words *hale* and *whole* (whole ought to be spelt *hole*) are derived from the same source as the Greek word *kalos*, which meant *beauty*.

Yet health is neglected and slighted every day, while there are few who would not sell their very

[5] July 18th, 1885, p. 124.

souls to be beautiful while ignoring the best means to the desired end.

An old writer quaintly observed: "Who is he that values *health* at the *rate* it is *worth?* Not *he* that hath it; he reckons it among the *common ordinary* enjoyments, and takes as little *notice* of it, or *less* regards it than his long-*worn clothes*—perhaps more careful of his *garments*, remembering their price; but thinks his *health* costs him *nothing*, and coming to him at so easy a *rate*, values it accordingly, and hath little *regard* to keep it; is never truly sensible of what he *enjoyed* until he finds the *want* of it by *sickness;* then *health* above *all things* is earnestly desired and wished for."

"You that have health," he continues, "and know not how to *prize* it, I'll tell you what it is that you may love it better, and put a higher *value* upon it, and endeavour to *preserve* it with a more *serious, stricter* observance and tuition.

"*Health* is that which makes your *meat* and *drink* both *savoury* and *pleasant*, else nature's injunction of *eating* and *drinking* were a hard task and slavish custom.

"*Health* is *that* which makes your *bed easy* and your *sleep refreshing;* that revives your *strength* with the rising sun and makes you *cheerful* at the light of another *day;* 'tis that which fills up the hollow and uneven places of your carcase, and makes your body *plump* and *comely;* 'tis that which *dressed* you up in Nature's *richest attire*, and *adorns* your face with her *choicest* colours.

"'Tis *that* which makes *exercise* a *sport*, and walking abroad the enjoyment of your *liberty*.

"'Tis that which makes *fertile* and increaseth the natural *endowments* of your *mind*, and preserves them *long* from *decay*, makes your *wit* acute, and your *memory retentive*.

"'Tis *that* which supports the *fragility* of a corruptible body, and *preserves* the *verdure*, *vigour*, and *beauty* of youth.

"'Tis *that* which makes the *soul* take delight in her *mansion*, sporting herself at the casements of your eyes.

"'Tis that which makes *pleasure* to be *pleasure*, and delights, delightful, without which you can solace yourself in nothing of *terrene* felicities or enjoyments.

"Now take a view of yourself when *health* has turned its back upon you, and deserts your *company*; see then how the *scene* is changed, how you are robbed of and spoiled of all your comforts and *enjoyments*.

"Sleep that was stretched out from *evening* to the *fair*, *bright day*, is now broken into pieces and *subdivided*, not worth the accounting; the *night* that before seemed *short* is now too *long*, and the downy bed presseth hard against the bones.

"*Exercise* is now *toyling*, and *walking abroad* the carrying of a *burthen*.

"The *eye* that flasht as lightning is now like the *opacous* body of a thick cloud;—that rolled from *east* to *west* swifter than a *celestial orb*, is now tired

and weary with standing still;—that penetrated the centre of another *microcosm*, hath lost its planetary influence, and is become obtuse and dull," &c.[5]

Are not these considerations enough to urge any one to the "study and observance of Nature's institutions," and to avoid "injurious customs, ways, and manners of living?"

Health is not only the source of beauty, but without it happiness is impossible, so that vanity and self-love alike urge us to preserve it; but there is a still loftier motive which should join with these to induce us to take care of ourselves, and that is that, if we allow our own constitutions to be undermined by neglect or carelessness, we make it impossible for us to be able to care for others, and instead of being a help to those we love, we become a burthen to them.

As a parting word of advice let me close this volume with the words of the philosopher Sir Thomas Browne: "Where nature fills the sails the vessel goes smoothely on; and where judgement is the pilot the rate of insurance need not be high."

[5] Maynwaringe on "The Method and Means of Health." 1683.

THE END.

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